LWG
LOWER WILLAMETTE GROUP

Sediment Profile Image Survey of the Lower Willamette River

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

DGPS	Differential Global Positioning System
LWG	Lower Willamette Group
PSY	Portland Shipyard
RI/FS	Remedial Investigation/Feasibility Study
RM	River Mile
RPD	Redox Potential Discontinuity
SAP	Sampling Analysis Plan
SPI	Sediment Profile Image
SWI	Sediment-Water Interface

1.0 INTRODUCTION

This report presents the results of a Sediment Profile Image (SPI) survey conducted in the Lower Willamette River from RM (RM) 0 (the Willamette's confluence with the Columbia River) upstream to RM 15.7 (the upstream edge of Ross Island) in December 2001. The survey was conducted by the Lower Willamette Group (LWG) as part of preliminary or Phase 1 Studies of the Portland Harbor Remedial Investigation/Feasibility Study (RI/FS). This report is a required deliverable under the Stipulated Agreement for Portland Harbor which was incorporated by reference into the Administrative Order on Consent for the Portland Harbor CERCLA Site.

Prior to the start of the survey, a complete Sampling and Analysis Plan/Quality Assurance Project Plan/Health and Safety Plan were submitted to EPA (SEA 2001). This survey was completed in accordance with those plans.

1.1 STUDY OBJECTIVES

The purpose of this study was to provide reconnaissance information on physical and biological features of surface sediments in the Lower Willamette River from Ross Island to the Columbia River. These data, in addition to information from other Phase 1 efforts (e.g. precision bathymetry, Sediment Trend Analysis® survey), provide information needed to develop an effective approach to the RI/FS for sediments in the Lower Willamette River.

Specifically, the objectives of the SPI survey were to generate and supplement survey area-wide information on (SEA 2001):

- Grain size distributions
- Patterns in physical disturbance
- Benthic community distributions
- Gradients in benthic habitat conditions, especially in the nearshore areas.

1.2 STUDY DESIGN

SPI images were obtained from 478 stations in the Lower Willamette River from RM 0 to RM 15.7. In general, stations were located along regularly spaced, cross-river transects. SPI station locations are shown in Figure 1-1.

Along each transect, the greatest number of stations were placed in the nearshore areas (those having water depths of 20 feet or less, Columbia River Datum, CRD). It was anticipated that the nearshore areas would exhibit the greatest heterogeneity of sediment types, and potential land uses and habitats. Nearshore stations accounted for about two thirds of the total number of stations sampled. The remaining stations were located within the federally-maintained navigation

channel or the main river stem. Because of its more uniform depths and physiography, benthic conditions in the channel were considered likely to be less variable than nearshore, off-channel areas.

The study area has been divided into three subareas with different sampling densities as described below. The densest station grid was located within and just beyond the Initial Study Area (RM 3.5-9.2), as defined in the RI/FS Statement of Work. SPI data from this area will contribute to the development of RI sampling strategies and may help in the interpretation of other data types. The lower (RM 0-3) and upper (RM 9.7-15.7) river segments were sampled at a lower station density. These data catalog general bottom conditions and habitats in these river segments and may help locate reference areas for the RI in upstream areas.

Upper Willamette River (RM 9.7 to RM 15.7): A total of 24 cross-river transects spaced 400 meters apart were sampled in this region (Figure 1-1a, b). Stations were designated along each transect at target depth contours (10 and 20 ft isobaths) on each side of the channel and in the channel itself (40+ ft isobaths). The federal channel terminates at RM 11.7. Upriver of this point, stations were located at target depths by the field crew based on the vessel's fathometer. Generally, four stations were sampled on each transect, with up to three placed in the nearshore, shallow (< 20 ft) areas and one located in the channel or a relatively deep mid-river location. Although targeted in the SAP, there were no stations sampled within Ross Island Lagoon because access was denied.

Portland Harbor Area (RM 3 to RM 9.7): A total of 54 cross-river transects spaced 200 meters apart were sampled in the Portland Harbor Area (Figure 1-1b, c, d). As in the upper river, stations were located along each transect at the target depth contours (not shown) on each side of the federal channel and in the channel itself. Approximately six stations were designated per transect. Four stations were generally located in the nearshore shallow (≤ 20 ft) areas outside the channel, and two were located in the channel (> 40 ft) including both toe and mid-channel areas. Swan Island Lagoon and other off-river areas were also sampled. In these areas, stations were randomly staggered along the transects (Figure 1-1b).

Lower Willamette River (RM 0 to RM 3): A total of 16 cross-river transects spaced 300 meters apart were sampled (Figure 1-1d). On each transect, stations were located at real-time target depth contours on both sides of the federal channel and in the channel itself. Typically, six stations were occupied on each transect. Four stations were located in the nearshore shallow (≤ 20 ft) areas outside the channel and two were located in the channel (≥ 40 ft) including both toe and mid-channel areas.

2.0 METHODS

This section provides an overview of the methods used to collect and analyze SPI data along with detailed documentation of the field survey. The discussion of the sampling, sampling methods and analyses will be referenced to the SAP (SEA 2001), and any deviations will be noted.

2.1 FIELD METHODS

The sediment profile imaging survey of the Willamette River was conducted from 28 November 2001 through 11 December 2001. The survey was conducted by Striplin Environmental Associates (Olympia, WA) and its subcontractors, Blue Water Engineering (Seattle, WA) and Germano and Associates (Bellevue, WA). All sampling was conducted aboard the R/V Nancy Ann, owned and operated by Marine Sampling Services of Burley, WA.

2.1.1 Navigation and Positioning

All vessel navigation and positioning was accomplished using a differential global positioning system (DGPS) interfaced to an integrated navigation system. A Trimble Model XX DGPS was used for positioning with navigation data output to a computer running HYPACK™ navigation and data acquisition software. The U.S. Coast Guard Astoria differential correction signal was used during this survey for the DGPS navigation. During the survey, the DGPS antenna was mounted above the lifting point of the SPI camera in order to record the position of image acquisition.

At the start and conclusion of each survey day, the vessel was piloted to a known, fixed location and the vessel position recorded. This served as a check on navigation system accuracy. Throughout the duration of the survey, coordinates were both manually and digitally recorded at the time of each camera deployment and image acquisition event. The navigation log maintained during the survey and a complete listing of image acquisition coordinates is provided as Appendix A.

2.1.2 Sediment Profile Image Collection

Throughout the survey, a Benthos Model 3731 sediment profile camera (Benthos Inc., North Falmouth, MA) was used. A camera schematic and depiction of camera deployment is shown in Figure 2-1. All sediment profile images were collected using Kodak® Ektachrome ISO 200 color slide film. During each deployment, two images were collected: one five seconds after the camera contacted the seafloor, and another fifteen seconds after the camera contacted the seafloor. The camera was deployed three times at each station, collecting a total of six images (three replicate image sets with each set consisting of a 5 second and 15 second exposure).

For each station sampled, the vessel was piloted to the target location while the water depth was monitored. In the nearshore areas, SPI sampling stations were targeted at the 10 ft and 20 ft water depths. In instances where the target station coordinates were not at the desired depth interval, the vessel was piloted to a different location along the sampling transect that had the requisite water depths before the camera was deployed. Specific water depth values were not determining factors while sampling the main body of the river channel away from the nearshore and shallow areas; in the channel, the vessel was piloted to the target coordinates, and three replicate deployments were collected. All deployments were collected within 50 ft of the target station coordinates at these locations. In the nearshore areas where stations were moved to the intended water depths, all replicate images were collected within 50 ft of the first replicate. At a few stations, especially some nearshore stations within the Initial Study Area (ISA), as defined in the AOC/SOW (RM 3.5 to 9.2), the target sampling station was obstructed by either debris, fixed obstacles (e.g. submerged piling), or moored vessels. To the extent possible, areas as near to the target station as practical were sampled, rather than the target location itself. Procedures for sampling at these stations were similar to those described for the other nearshore stations. Figure 1-1 shows the actual station locations and sampling transects.

Throughout the survey, the field crew kept redundant sample logs. Image collection sheets and SPI logs are provided as Appendix B. Information included in the field data sheets and SPI logs included: personnel, weather conditions, date, station, time, water depth, camera frame count, estimate of camera prism penetration, and other salient observations regarding the station area and camera performance. At the end of each day, the film from that day's sampling was removed from the camera housing and sent to a processing laboratory (Citizens Photo, Portland, Oregon). The images were processed overnight, and the results viewed the next day to confirm acceptable image acquisition (e.g. sufficient penetration). In the event that the images from a station were deemed unacceptable (e.g. over- or under-penetration), the station was resampled at a later date in the survey.

2.1.3 Summary and Schedule of Field Sampling

A chronological summary and brief synopsis of field sampling is provided below.

26 November 2001: Transit to site and mobilization.

27 November 2001: SPI sampling from Transects 17 to 27, with 58 stations sampled.

28 November 2001: SPI sampling from Transects 27 to 37, with 51 stations sampled.

29 November 2001: SPI sampling from Transects 37 to 49, with 62 stations sampled.

30 November 2001: SPI sampling from Transects 49 to 61, with 60 stations sampled

3 December 2001: SPI sampling from Transects 61 to 76, with 62 stations sampled.

4 December 2001: SPI sampling from Transects 76 to 88, with 53 stations sampled.

5 December 2001: SPI sampling from Transects 8 to 16, with 53 stations sampled.

6 December 2001: SPI sampling from Transect 1 to 7 and stations within the Swan Island lagoon on Transects 57 to 64, with 51 stations sampled.

7 December 2001: SPI sampling from Transects 88-93 and stations that were overpenetrated along Transects 52, 55, 57, 60, 63-68, 70, 71, 73, 74 and 85, with 49 stations sampled.

10 December 2001: SPI sampling of stations that were overpenetrated along transects 5, 6, 9, 10, 14, 15, 16 and 61, with 15 stations sampled, along with image review.

11 December 2001: Demobilization and transit.

2.2 ANALYTICAL METHODS

2.1.1 Image Selection, Scanning and Calibration

All image analysis was done with a computerized image analysis software package using digital scans of the slide film. Prior to scanning the SPI images, the replicate sets for each station were reviewed for image quality and representativeness. Typically, one image per station was analyzed, and this image was selected based on image quality and typicity. For example, at a given station, the image showing the greatest penetration (without overpenetrating) that also showed the least sampling-related disturbance of the sediment column was selected for analysis. Selected images were also representative of the features observed in all images from that station. At those stations where a wide variability of sediment types or biological features was observed, more than one image from that station were analyzed to characterize the range of features at that station.

Once the images for analysis were selected, they were scanned to produce digital images. All scanning was accomplished using a Nikon SuperCoolScan 4000 ED (Nikon Inc, Japan). Images were scanned at 4000 dpi resolution with two times oversampling. Color was recorded at 8 bits per pixel. All raw scans were recorded as 4000x6000 pixel "jpeg" files. After scanning, each image was opened in Adobe Photoshop and equalized for intensity using the image histogram. Images for analysis were saved as 600x900 pixel .jpegs.

All image analysis was conducted using Jandel Sigmascan Pro (Jandel Inc.). Prior to analysis, an image of a standard color card and scale, taken with the SPI camera, was scanned, equalized and imported into Sigmascan Pro. This image was used to calibrate the analysis session by providing a known area and distance measure at the same scale as the SPI images. All analyses were conducted by a qualified scientist experienced in SPI data interpretation and computer image analysis. In addition, all of the data analyzed were reviewed for quality assurance and quality control by a separate senior SPI scientist.

2.2.2 Analytical Parameters

A description of the analytical parameters and the procedures used to measure the parameters follows. Interpretive criteria for each SPI parameter may be found in Appendix C.

Image Width

The width of each image was measured as a linear distance. The measure of image width was used in the calculation of all mean measurements that were averaged across the width of the image frame. Image widths varied slightly, from 13.95 cm to 14.04 cm, and this 0.09 cm variation is attributable to curvature of the film surface.

Penetration

Penetration was measured as the mean penetration of the camera prism across the entire frame of the image. To measure penetration, the entire image area occupied by sediment was digitized and measured. The measured area occupied by sediment was then divided by the width of the frame to calculate the mean penetration across the entire frame. In addition, linear measurements of minimum and maximum penetration were also recorded. Boundary roughness, the surface relief at the sediment-water interface, was also calculated from the difference between the maximum and minimum penetration measurements.

Apparent Redox Potential Discontinuity (RPD)

The apparent RPD is a measure of the mean distance that oxidized sediment extends downward into the sediment column. This parameter was measured by digitizing the area of light colored, oxidized sediment over the entire image frame. This area was then divided by the image width to provide a mean thickness of the

RPD over the entire frame. In addition, linear measurements of the minimum and maximum RPD thickness were also made and reported.

Grain Size Major Mode and Range

Grain size major modes were estimated by comparing the sediment in the SPI images to unimodal pictures of known particle sizes. In addition, the minimum and maximum particle size observed in the SPI images were also reported. In images where gravels and cobbles were present, the minor axis of these particles was measured to provide grain size metrics.

Feeding Voids

Feeding voids are pockets of sediments that have been excavated by benthic infauna through deposit feeding, typically in a head-down orientation. Feeding voids were identified by the image analyst and enumerated. In addition to the analyst recording the number of feeding voids present in each image, the minimum and maximum depth of the feeding voids within the sediment column were measured as a linear distance from the sediment-water interface.

Methane

Methane gas present in the sediment column was measured both by counting the number of methane vesicles within the sediment column and measuring the area occupied by methane vesicles within the entire sediment column. The total number of methane vesicles was a simple enumeration of each methane pocket observed. To measure the area occupied by methane vesicles, each methane vesicle was digitized to measure its area, and the measured areas of each methane vesicle were summed to provide a total area of methane within the sediment column. In addition, the minimum and maximum depths of methane within the sediment column were measured as linear distance from the sediment-water interface.

Infaunal Successional Stage

Designations of infaunal succession stages were made for each analyzed image by observing the biological features present in the image and attributing the features to functional types of benthic infauna. A complete discussion of benthic successional seres may be found in Appendix C. Stage 3 infauna were identified by the presence of subsurface feeding voids and burrows, Stage 2 fauna were identified by dense amphipod tubes and/or the presence of shallow feeding voids, and Stage 1 fauna were identified by small surface tubes without associated infaunalization. The infaunal succession stage was classified as indeterminate when there were insufficient features to classify the community type unequivocally.

Comments

In addition to the above metrics, salient observations from each analyzed image were recorded in a comment field. These observations included but were not limited to: sediment fabric, presence of debris, presence and depth of organisms

within the sediment column, unusual sediment textures and features related to organic content, sediment sorting, layering, sediment transport, and whether a station appeared erosional, depositional or static.

3.0 RESULTS

This section details the results of the SPI survey of the Lower Willamette River. A total of 523 images from 478 stations were analyzed. Replicate images were analyzed at 45 stations (9 percent replication). A summary of the SPI results is presented in Table 3-1 and the complete results are provided in Appendix D. Thumbnail images of each SPI image analyzed are provided in Appendix E.

The results of the survey will be discussed by river segment:

- The upper Willamette River survey area from RMs 15.7 to 9.7,
- The Portland Harbor survey area from RMs 9.7 to 3.0, and
- The mouth or lower Willamette River segment from RMs 3.0 to 0.

The results are presented from the survey area farthest upstream (RM 15.7) and proceeding down stream to the confluence of the Willamette and Columbia Rivers (RM 0). Selected parameters measured from the SPI images are mapped and presented in Figures 3-1 through 3-6. Each parameter is mapped over the entire river in four panels (A through D).

3.1 UPPER WILLAMETTE RIVER RESULTS (RMS 15.7 TO 9.7)

This area extends from Transects 70 –93 (Figures 1-1a and 1-1b), covering the portion of the river from the Port of Portland's Terminal 2 to the upstream tip of Ross Island. Physical and biological parameters measured from the SPI images are mapped and presented in Figures 3-1 through 3-6. At stations that were analyzed in duplicate, both results are presented on the maps. The main river stem (≥20 ft depth) of this upper Willamette River area is subdivided into two distinct zones based on river morphology and SPI results. These zones are from RMs 15.7 to 11.0 and from miles 11.0 to 9.7.

3.1.1 Upper Willamette River Physical Features

Physical parameters measured include prism penetration depth and sediment grain size. These parameters are mapped together in Figure 3-1. In this figure, prism penetration depth and sediment grain size major mode are superimposed on the site bathymetric data.

Prism Penetration Depth

The depth the camera prism penetrates into the river bottom is related to the bearing strength and water content of the sediment. Although the amount of weight within the camera frame varied throughout the survey and the stops used to prevent prism overpenetration were also adjusted, the prism penetration depth still provided a measure of relative sediment bearing strength throughout the

surveyed area. With respect to the Willamette River, those areas that showed deep penetration due to water-rich sediments were also areas where sediments were most likely deposited recently.

In the area above Ross Island downstream to the Fremont Bridge (RM 15.7 to 11), prism penetration depth was generally shallow, with most measurements less than 10 cm. Within the main flow of the Willamette River in this segment, no station located in the channel had a prism penetration depth that exceeded 9.5 cm and the vast majority of within-channel stations had prism penetration depths less than 5 cm. This illustrates the relatively hard, compact nature of sediments within the main channel throughout this section of river.

The only areas that exhibited prism penetration depths in excess of 10 cm were the nearshore areas outside the main flow of the river, specifically in the pool area at the southwestern tip of Ross Island and in the wide nearshore bank areas along this stretch of river.

There were also numerous locations within this stretch of the river where the camera prism did not penetrate into the river bottom. This may be attributed to one or more of the following reasons: presence of debris (e.g. submerged logs and snags), presence of submerged structures (e.g. piles and mooring cables), hard substrate, or localized high surface relief. It should be noted that in this river segment, river bottom surface relief varies greatly with high relief in localized areas.

Downstream of the Freemont Bridge to Terminal 2 (RMs 11 to 9.7), the river broadened, and greater prism penetration depths were observed, with many stations in the river channel having penetration depths greater than10 cm. Sediments within RMs 11 to 9.7 were generally softer and more water-rich than those upstream.

Sediment Grain Size Major Modes

The distribution of sediment grain size major modes in the entire upper Willamette River stretch (RM 15.7 to 9.7) is shown in Figure 3-1a and b. The river segment from miles 15.7 to 11 was primarily composed of sands and gravels within the main channel body. Within this segment, fine-grained sediments were restricted to shallow bank areas (<20 ft water depth) and in deeper pools in the vicinity of Ross Island that were isolated from the main flow of the river.

Representative images from Stations 80C and 88B, located in the main channel from mile 15.7 to 11 segment, are shown in Figure 3-7. These images illustrate the coarse-grained sediments found within the main flow of the river. At Station 88B, the sediment was comprised of gravels with interstitial fine-grained sediment. Station 80C showed a migrating medium to coarse sand ripple over stiff silt. In both of these images, the sediment texture reflects the strong bottom

currents, with fines being washed away by flow and coarse particles migrating with the flow via bedload transport in the form of ripples.

The sediment type along the shallow nearshore (<20 ft depth, CRD) areas was highly variable, and ranged from medium sand to water-rich silts and clays. Representative images from Stations 90A (replicates A and B), 83A, and 92A are shown in Figures 3-8 and 3-9 respectively. Figure 3-8 illustrates within-station variability of sediment type and biological features at Station 90. This nearshore station was comprised of organic-rich, fine-grained sediment that appeared hydrodynamically stable. At Stations 83A and 92A, the nearshore sediments were comprised of slightly sandy silts with distinct layering, indicating that sediment was deposited episodically at these stations. It should be emphasized that the layered profile seen in the SPI images from stations 83A and 92A was typical for nearshore stations located along broad shallow areas of the lower Willamette River.

Downstream of the Fremont Bridge, from miles 11 to 9.7, the character of the river changed as the Willamette became wider, which provided with more flow area. In this region, most of the sediments within the channel and along the nearshore areas were fine-grained silts and clays with varying amounts of fine sand admixed or layered within the sediment column. Figure 3-10 shows images from Stations 74B and 71A, located in the deeper, main-channel area. These stations exhibited very fine-grained, water-rich sediment that allowed high camera prism penetration. These stations appear to be depositional, as very fine-grained, water-rich sediment would likely be easily eroded or re-suspended in a high flow environment.

In the upper segment areas of the mile 11 to 9.7 section, the sediments were similar to those observed in the upstream nearshore areas. Representative images from stations 73D and 70C, located in nearshore areas of the mile 11.0 to 9.7 river segment are presented in Figure 3-11. The sediments at stations in this area were composed primarily of silts and clays with minor amounts of fine sands. In addition, these sediments showed layering of silts and fine sands similar to the nearshore stations upstream.

3.1.2 Upper Willamette Chemical and Biological Features

Chemical and biological features measured from the profile images include apparent RPD depth, subsurface methane area, and infaunal successional stage. Each of these parameters is mapped and presented in Figure 3-2 through 3-4. In addition, a summary of inferred physical processes and biological features are mapped in Figures 3-5 and 3-6 respectively.

Redox Potential Discontinuity

The distribution of mean apparent RPD depths in the upper Willamette River (miles 15.7 to 9.7) is shown in Figures 3-2a and b. The RPD is measured as the

thickness of the band of oxidized sediment at the sediment-water interface. The presence and thickness of the surface oxidized layer in marine and estuarine ecosystems is typically attributed to the burrowing and feeding activity (bioturbation) of resident infauna such as worms, clams, and shrimp. In river systems, the physical action of strong bottom currents and the rapid deposition of oxidized suspended sediment may also contribute to the thickness of the surface oxidized layer.

Within the main body of the river channel from mile 15.7 to 11, the depth of the mean apparent RPD at most stations was indeterminate (Figures 3-2a and 3-2b). As discussed previously, these stations were primarily composed of coarse-grained sediments (sands and gravels) or alternatively, allowed no prism penetration due to either debris or hard substrate (Figures 3-1a and b). At stations where there was no prism penetration or where there were insufficient amounts of fine-grained sediment, the apparent RPD cannot be measured as indeterminate. Images from the channel stations are shown in Figure 3-7. The coarse-grained sediments were comprised of lithic and mineral fragments with very little fine-grained sediment. The tan oxide coatings that delimit the apparent RPD in SPI images are associated with fine-grained and/or organic particles within the sediment column; therefore, the detection of an apparent RPD in these coarse-grained sediments was precluded by the lack of fines. In instances where there was a detectable redox layer, it was very thin and more likely due to physical forces (deposition and flow-induced irrigation) rather than biological processes.

In the nearshore areas of the upper survey area that consisted of fine-grained sediments and high prism penetration depths, the surface oxidized layers were deep, often in excess of 6 cm. At many of these stations, the depth of the mean apparent RPD appears to be a product of both biological reworking and rapid deposition of fine-grained, oxidized sediment. Images from nearshore stations are shown in Figures 3-8 and 3-9.

In the upper Willamette River segment from mile 11.0 to 9.7, the depth of the mean apparent RPD within the main channel became greater (often exceeding 6 cm) downstream of Transect 74 (RM 10.9). As shown in Figure 3-2b, a broad band of stations with deep apparent RPDs were present in the central channel and continued downstream into the Portland Harbor river segment. Representative SPI images from the mile 11.0 to 9.7 river segment are shown in Figure 3-10. Figure 3-10 shows the soft, fine-grained sediments with deep surface oxidized layers that are typical of this region. The thickness of the mean apparent RPD in the main channel within this segment of river appear to have been caused by the deposition of oxidized, fine-grained sediments rather than pore-water irrigation associated with bioturbation.

The nearshore sediments in the 11.0 to 9.7 mile segment were similar to those observed upstream. They show variable features which are dependent upon

location and river morphology. Representative SPI images from depositional nearshore stations are shown in Figure 3-11. As illustrated in this figure, the thickness of the mean apparent RPD in the depositional nearshore areas was quite large and showed evidence of recent influx and deposition of oxidized, fine-grained sediments.

Sedimentary Methane

Sedimentary methane is generated by the anaerobic decomposition of organic matter within the sediment column. In fresh water systems, methanogenesis occurs early in the decomposition sequence as surface and pore waters have low sulfate levels, and sulfate reduction is of limited importance relative to aerobic respiration and methanogenesis (in contrast to marine or alkaline waters). For methane to be generated, sediments must have organic material for decomposition, limited influx or irrigation of oxygen into the sediment column, and decomposition occurring at a rate that exceeds oxygen replenishment.

In the upper Willamette River, miles 15.7 to 11.0, *in-situ* sedimentary methane was observed only at five depositional nearshore stations (Figures 3-3a and b). Representative SPI images from Station 90A showing *in-situ* sedimentary methane are shown in Figure 3-8. The absence of methane from the main channel areas of the upper Willamette River was conspicuous. The coarse sediments found within the main channel apparently had a paucity of fine-grained sediment and organics, thereby precluding the generation of sedimentary methane.

The distribution of methane in the 11.0 to 9.7 mile segment of the upper Willamette River is shown in Figure 3-3b. Similar to the upstream segment, sedimentary methane was observed only in depositional nearshore areas along the western bank of the river.

Infaunal Successional Stage

The distribution of infaunal successional stages in the Upper Willamette River from RM 15.7 to 9.7 is shown in Figures 3-4a and b. The designation of an infaunal successional stage was determined by the type of infauna or infaunal structures present in the sediment column. Stage 1 fauna are typically shallow-dwelling, tube builders that feed at or near the sediment-water interface. These organisms are typically the first colonizers after a disturbance of the sediment. Stage 3 fauna are typically deep burrowers that feed within the sediment column in a head-down orientation. Stage 3 taxa are generally longer lived than Stage 1 fauna and are the slowest to re-colonize a disturbed area.

The distribution of infaunal successional stages in the upper Willamette River generally mirrored the distribution of fine-grained sediments, with Stage 3 fauna observed primarily within the fine-grained nearshore sediments. In the main river stem, the successional seres were primarily Stage 1, reflecting both the coarse grain-size and physical disturbance associated with this channel environment. At

stations where there was minimal or prism penetration (e.g. debris, hard substrate) the infaunal succession stage determination was classified as indeterminate.

It should be emphasized that in the 15.7 to 11.0 mile segment of the Upper Willamette River, only nearshore stations that were depositional (where sediment was accumulating) exhibited fine-grained sediments. These stations were located in low-flow velocity or quiescent areas, which, in tandem with other processes, allowed the deposition of fines and sufficient periods of stability (i.e. no disturbance) to develop mature successional assemblages. Figure 3-8 shows nearshore, fine-grained sediments with Stage 3 fauna present.

The distribution of infaunal successional stages in the 11.0 to 9.7 mile segment of the upper Willamette River is shown in Figure 3-4b. The main difference between this and the upstream segment was that Stage 3 infauna were present in main channel sediments from Transect 72 (RM 10.5) to Transect 70 (RM 9.7). It has been noted previously that this area was largely depositional and characterized by soft silts with thick oxidized surface layers. Suitable habitat for Stage 3 infauna (soft silts and/or sandy sediment without constant physical disturbance) was not present in the upper survey area until this portion of the river. Images from the main channel showing Stage 3 infauna are presented Figure 3-10.

Additional Physical and Biological Processes

Features in the SPI images that were indicative of various physical and biological processes were noted during the analysis. These features included, but were not limited to, sediment sorting and fabric, the presence of bedforms, faunal structures, and the presence of debris. Combinations of such features can be used to infer the extent to which a location is erosional or depositional. Physical processes deduced from observed features in the upper Willamette River are mapped in Figures 3-5a and b. These figures indicate that the Willamette from miles 15.7 to 11.0 is dominated by high current flow and sediment transport. The only areas that showed deposition were nearshore areas away from the main flow of the river. The physical and biological results discussed in the previous sections reflect the dynamic nature of this chute-like segment of river.

Biological processes deduced from observed features are shown in Figures 3-6a and b. Again, the presence of biological features is controlled by physical disturbance and deposition in the 15.7 to 11.0 mile river segment. Figures 3-5b and 3-6b present the physical and biological processes observed in the 11.0 to 9.7 mile segment of the Upper Willamette River respectively. These figures show that this segment of river was transitional from the chute-like, dynamic upstream stretch to a more quiescent, depositional regime. Fine-grained sediment, deep apparent RPD layers, sedimentary methane, and Stage 3 infauna all became more prevalent in this stretch of river. Again, it should be emphasized that processes

inferred are a process of the physical dynamics of the river which in turn are related to physical morphology and flow rates.

3.2 PORTLAND HARBOR RESULTS (RMS 9.7 TO 3.0)

This area extends from Transects 69 to 17, covering the portion of the river from the Port of Portland's Terminal 2 to the Multnomah Channel. Physical and biological parameters measured from the SPI images are mapped and presented in Figures 3-1b-d through 3-6b-d. At stations that were analyzed in duplicate, both results are presented on the maps. This segment of the Willamette River is heavily industrialized and includes the RI/FS Initial Study Area (RM 3.5 - 5.2). To discuss the SPI results for this section of the river, the river has been divided into three segments based on river morphology and SPI features observed:

- The upper Portland Harbor segment from RM 9.7 to 7.0 (Port Terminal 2 to the Railroad Bridge – Transects 69 to 48),
- The middle Portland Harbor segment from RM 7.0 to 5.1 (the Railroad Bridge to the Port's Terminal 4 – Transects 47 to 33).
- The lower Portland Harbor segment from RM 5.1 to 3.0 (Terminal 4 to the Multnomah Channel – Transects 32-17)

3.2.1 Portland Harbor Physical Features

Physical features measured in SPI images from Portland Harbor included prism penetration depth and sediment grain-size major mode. The distribution of these parameters in the entire Portland Harbor river segment from mile 9.7 to 3.0 are mapped in Figures 3-1b through d.

Prism Penetration

Upper Portland Harbor

In the upper portion of Portland Harbor, RM 9.7 to 7.0 (Figures 3-1b and 3-1c), prism penetration depths were generally high, often in excess of 10 cm. The only stations within this stretch of river that had prism penetration depths less than 10 cm were located in shallow, inshore areas. Except for two stations near the Portland Shipyard, all stations within the main channel of this segment of the Willamette River had prism penetration depths in excess of 10 cm, with the majority of stations having penetration depths of 15-20 cm. Based on the prism penetrations depths, the sediments within this segment of river generally had low bearing strength and high water-content.

Middle Portland Harbor

Within the mile 7.0 to 5.1 reach of Portland Harbor (Figure 3-1c), prism penetration depths became shallower and more variable both along and across the river in comparison to the mile 9.7 to 7.0 segment. In the 7.0 to 5.1 mile segment, more than half of the measured prism penetration depths within the main channel

of the river were less than 10 cm. The greatest prism penetration depths were found in localized nearshore areas, and within these areas, prism penetration depth was also highly variable. These results indicate that this portion of the Portland Harbor river segment was composed of firmer and more highly variable sediments than those observed in the upper Portland Harbor stretch.

Lower Portland Harbor

The lower reach of Portland Harbor, RM 5.1 to 3.0 (Figures 3-1e and 3-1d), was characterized by greater penetration depths than those observed in the 7.0 to 5.1 mile segment, but less than those observed in the mile 9.7 to 7.0 segment. The majority of prism penetration depths were greater than 10 cm in both the nearshore and channel regions. Those stations that had prism penetrations less than 10 cm were isolated stations within the channel between Transects 25 and 19 and were surrounded by softer sediments. Within the nearshore regions, those stations having penetration depths less than 10 cm show a variable distribution and appeared to be related to anthropogenic perturbations (e.g., prop wash) of the river shore.

Sediment Grain Size Major Modes

The distribution of sediment grain size major modes throughout the Portland Harbor river segment is presented in Figures 3-1b through 3-1d.

Upper Portland Harbor

In the upper Portland Harbor river segment, the vast majority of stations in both the nearshore and channel region were composed of soft, fine-grained sediments (silts and clays) that had varying minor amounts of fine sand either admixed or layered within the silts and clays. The only stations that exhibited fine to medium sands were shallow, nearshore stations. These stations were located primarily on the west shore of the river from Transects 66 to 61 (Figure 3-1b). Isolated stations in the eastern nearshore areas of the river were also composed of sand. Representative images from Stations 62C and 48C, located within the main channel, are presented in Figure 3-12. These stations were composed of gray silts and clays with minor amounts of sand. They are exceptionally water-rich and appear to be highly depositional with silts and clays accumulating over time.

Within the upper Portland Harbor segment, there were also stations located in areas previously dredged. Representative images from stations within these areas (Stations 69D and 51D) are shown in Figure 3-13. These stations were composed of gray, water-rich silts and clays with minor amounts of fine sand. They also show faint layering, indicating that there was episodic deposition of fine-grained sediment within these excavated regions. These sediments were very similar to those found within the main channel.

Representative images from fine-grained nearshore stations, 60A and 49A, are shown in Figure 3-14. Representative images from nearshore stations showing sands, Stations 67A and 66F, are presented in Figure 3-15. The images from the

depositional nearshore stations (Figure 3-14) show features that are common to nearshore stations upstream of Portland Harbor including layering, episodic deposition, and sedimentary methane. Stations 67A and 66F (Figure 3-15) show nearshore sediments that have been physically disturbed by either currents or anthropogenic activities.

Middle Portland Harbor

The middle Portland Harbor river segment exhibited a more variable range of sediment grain-sizes. Stations within the central channel were dominantly fine to medium sands with varying amounts of silts either layered with the sand or admixed with the sands. Representative images of coarse-grained (fine sand or coarser) channel sediments from Stations 47C and 36B are shown in Figure 3-16. At Station 47C, the sediment was primarily well-sorted, medium sand and was indicative of a high flow regime. Bedforms (ripples) were present, and most fine-grained material had been winnowed away. At Station 36B, the sediment was dominantly fine to medium sand with admixed silts and clays at depth within the sediment column. The sediment surface was washed free of fines. In addition, the layering within the sediment column at Station 36B was striking. This layering, coupled with the coarse grain-size and washed surface, indicated that this station is likely to be subjected to periods of sediment transport alternating with periods of deposition. Many stations within the main portion of the channel also exhibited fine-grained sediments with distinct depositional features (layering, sedimentary fabric). Representative SPI images from Stations 39C and 36C are shown in Figure 3-17. These stations were located within the channel and were composed of layered, fine-grained sediments and sands. They illustrated the variable nature of within-channel sediments in the Middle Portland Harbor segment. Similar to those shown in Figure 3-16, sediments from Stations 39C and 36C appear to have undergone cyclical transport and deposition, although at the time of the survey, they appeared to be accumulating sediment. Based on the SPI results, this segment of river appeared to be a spatial and temporal mosaic of coarse-grained erosional areas alternating with layered fine-grained depositional areas.

Comparable to the channel stations, the nearshore stations within the middle Portland Harbor segment showed both fine-grained sediments and coarser sands. Representative images from nearshore Stations 44A and 37A are shown in Figure 3-18. These stations were composed of sands with varying amounts of layered and/or admixed silts. Station 44A was composed primarily of well-sorted, brown medium sand with a veneer of fines at the sediment-water interface. These sands overly firm gray clay and appear to be transgressive. At the time of the SPI survey, the veneer of fine-grained sediment at the sediment-water interface indicated that there was a period of relative hydrodynamic quiescence (perhaps reflective of a rising river stage in this nearshore area) that preceded the SPI survey. At Station 37A, the sediment was dominantly fine to medium gray sand with tan-colored, fine-grained sediment layered within the sand. The features in

the cross-sectional profile showed that this particular area was frequently reworked by either currents or wind-generated waves, suggesting a dynamic nearshore environment. Some nearshore stations in this area also exhibited fine-grained sediments. Representative images from Stations 42A and 35D showing fine-grained sediments are shown in Figure 3-19. Again, the features observed at stations 42D and 35D are similar to sediments and features seen in depositional nearshore areas elsewhere in the river.

Lower Portland Harbor

The distribution of sediment grain-size in the lower Portland Harbor river segment is shown in Figures 3-1c and 3-1d. Within the main body of the river channel, the sediments were dominantly fine-grained with varying amounts of sand either layered or with the fines. Representative images from the lower Portland Harbor river channel but outside of dredged areas (Stations 30C and 18D) are presented in Figure 3-20. These two stations were composed of similar sediment types and exhibited similar stratigraphic features. They were composed primarily of gray silts with minor amounts of admixed fine and medium sand with distinct layering. These stations appeared to undergo alternate periods of sediment transport and deposition, but the numerous normally-graded (becoming finer upward within each layer) sequences indicated that the stations were dominantly depositional.

Representative SPI images from Stations 30D and 28D, located within the dredged portions of the lower Portland Harbor river segment, are shown in Figure 3-21. Both of these stations were composed of soft, gray silts and clays overlying medium sands. There were only minor amounts of sands admixed within the silt fraction. In general, the sediments from Stations 30D and 28D appeared similar to the channel sediments from Stations 30C and 18D (Figure 3-20) but were slightly finer-grained and softer. Sand was present at these locations primarily within a basal strata (rather than intercollated via individual depositional episodes).

Sediments in the nearshore areas of lower Portland Harbor were dominantly fine-grained (silts and clays) as shown in Figures 3-1c through 3-1d. Sands were limited to isolated shallow nearshore stations and the broad shelf region where the Multnomah channel empties into the Willamette River. Representative images from Stations 30A and 23B, located in the nearshore regions of the lower Portland Harbor river segment, are shown in Figure 3-22. These images show typical nearshore, fine-grained sediments that have varying amounts of fine sand admixed or layered within the sediment column.

3.2.2 Portland Harbor Chemical and Biological Features

Chemical and biological parameters measured from SPI images include mean apparent RPD depth, area of the sediment column containing sedimentary methane, and the type of infaunal successional stage present. The distributions of

measured RPD depths throughout the Portland Harbor river segment (RMs 9.7 to 3.0) are shown in Figures 3-2b through d. The distribution of methane is presented in Figures 3-3b through d, and the distribution of infaunal successional stages is presented in Figures 3-4b and 3-4d.

Redox Potential Discontinuity

Upper Portland Harbor

The pattern of apparent RPD depths in the upper Portland Harbor River Segment (Figures 3-2b and 3-2c) showed that the main body of the river channel was dominated by deep RPD layers that are greater than 3 cm and often greater than 6 cm. It should be emphasized that in static or lacustrine fresh-water systems, well-developed RPD layers are typically 1-2 cm in thickness (SEA 1997). In the absence of bioturbating infauna, the depth of the mean apparent RPD would typically be less than 1 cm in thickness. However, the deepest RPD layers observed in the main channel of the upper Portland Harbor River segment are not fully attributable to bioturbation activities of the resident benthic infauna.

The deepest RPD layers (greater than 6 cm) were found primarily in the central channel and extended from the 9.7 mile mark to mile 8.6 (Transect 61). The area of exceptionally deep RPD layers found in the central channel was also surrounded by a region with deep RPD layers, but not at the magnitude displayed in the central channel. This area had oxidized surface layers that varied between 3 to 6 cm (Figures 3-2b and c). Figures 3-12 and 3-13 show images from stations located within the main channel and dredged areas of the Upper Portland Harbor river segment. In these images, individual laminae of fine sand can be seen within the RPD layer and are attributable to recent influx and deposition of oxidized, fine-grained sediment. Many of the RPD layers observed in this segment of the river were apparently made thicker by the rapid deposition of oxidized, fine-grained sediment in this portion of the river.

The shallowest RPD layers were found at two main channel stations, at isolated stations along the nearshore banks, and immediately outside of the easternmost dry-dock of the Portland Shipyard (Figure 3-2b). Within this segment of river, the RPD depths showed a systematic distribution that appeared to be related to deposition in the channel areas and physical disturbance and/or organic enrichment in the nearshore areas of the river.

The surface oxidized layers observed in the Swan Island Lagoon were also relatively deep (between 3 and 6 cm thick), appeared to be primarily depositional in origin, and were similar to those observed in the main channel (Figure 3-2b).

Middle Portland Harbor

The distribution of RPD depths measured from middle Portland Harbor sediments is mapped in Figure 3-2c. Sediments within middle Portland Harbor (from mile 7.0 to 5.1) generally exhibited lower apparent RPD depths than those immediately upstream. The vast majority of measured RPD values within middle Portland

Harbor were less than 3 cm. Isolated stations along the nearshore area exhibited RPD layers greater than 3 cm; one main channel station also fell into this category. In addition, there were numerous stations within the main channel and along the nearshore area that exhibited RPD layers less than 1.5 cm. As discussed previously, the middle Portland Harbor segment is a spatial and temporal mosaic of sediment types and the apparent RPDs in this river stretch also reflect that variability. It is important to note that apparent RPD depths are distinctly lower than those upstream and are not thickened by depositional processes.

Lower Portland Harbor

The distribution of apparent RPD depths measured in lower Portland Harbor are presented in Figures 3-2c and d. The RPD depths in this segment of river were less than those measured in the highly depositional upper Portland Harbor (miles 9.7 to 7.0) and greater than those measured in middle Portland Harbor (miles 7.0 to 5.1). In general, the majority of apparent RPD depths within the main channel area in this segment were between 2 and 3 cm thick. The deepest RPD layers were observed in the depositional nearshore areas (depths ranged between 3 and 6 cm). A distinct zone of lower RPD values (ca 1-2 cm) was observed in the Schnitzer slip area (Transect 22) and may be related to higher localized disturbance levels (e.g., prop wash). As previously discussed, the sediments within the lower Portland Harbor river segment are fine-grained (silts and clays) and the deeper RPDs in this area are reflective of deposition and increased physical stability.

Sedimentary Methane

Upper Portland Harbor

The distribution of sedimentary methane in upper Portland Harbor sediments, from mile 9.7 to 7.0, is presented in Figures 3-3b and c. Based on these figures, the sediments within the upper Portland harbor river segment were highly methanogenic, with methane present in the majority of stations within this river stretch. Unlike the upstream segments, where methane was observed only in depositional nearshore areas, methane was observed within both channel and nearshore sediments in the upper Portland Harbor segment. In addition to showing methane presence, Figures 3-3b and c also show the relative magnitude of methane present by area (total cm^2) of subsurface methane voids in each sediment profile image. The most methanogenic sediments, i.e., those having the greatest methane areas, were found along the eastern shore from RM 9.7 to 8.0. This area also had deep RPD layers and was highly depositional. The organic contribution to the sediment column could come from nearshore processes in this area or from upstream sources that are preferentially deposited in this region relative to other areas. SPI images showing *in-situ* sedimentary methane are presented in Figures 3-12 through 3-14.

Middle Portland Harbor

The distributions of sedimentary methane measured from SPI images from middle Portland Harbor are presented in Figure 3-3c. Within this segment of river, the distribution of sedimentary methane was restricted to nearshore stations that appear to be primarily depositional. Both the distribution and magnitude of methane within nearshore stations in middle Portland Harbor was less than that observed in the upper harbor segment. This reflects the more dynamic environment in the middle Portland Harbor segment and the apparent lower depositional rates in the nearshore area. The distribution of methane in this segment also approximated the distribution of the depths of fine-grained sediments.

Lower Portland Harbor

The distribution of sedimentary methane in lower Portland Harbor sediments is presented in Figures 3-3c and d. Methane was present primarily in sediments from nearshore depositional stations, although a few main channel stations also exhibited small amounts of sedimentary methane. Methane in the lower Portland Harbor sediment was more widespread than in the middle Portland Harbor, although less widespread than the upper Portland Harbor segment. Similarly, the magnitude of sedimentary methane in the lower Portland Harbor segment is intermediate between the middle and upper Portland Harbor segments. Representative SPI images showing sedimentary methane in the Lower Harbor are shown in Figures 3-20 and 3-22. Although sediments are methanogenic in this stretch, either the amount of organics deposited is less or there are higher porewater oxygen levels than in the Upper Portland Harbor.

Infaunal Successional Stage

Upper Portland Harbor

The distribution of infaunal successional stages in upper Portland Harbor is presented in Figures 3-4b and c. This segment of river was characterized by the widespread presence of Stage 3 infauna, both in nearshore and main channel sediments. Stage 3 fauna were also observed in the Swan Island Lagoon. The only areas that exhibited solely Stage 1 fauna, were the western main channel between miles 9.3 and 8.4, isolated nearshore stations, the northeast corner of Swan Island Lagoon, and the main channel of the river to the western shore between miles 7.5 and 7.1. The area of Stage 1 fauna coincided with the region of the upper harbor that had exceptionally deep RPD layers due to depositional processes. In this area, the lack of Stage 3 infauna, coupled with the exceptionally deep RPD layers, and recently deposited oxidized sediments strongly suggests that the deposition is occurring at a rate that exceeds the ability of any longer-lived, subsurface Stage 3 infauna to vertically migrate and survive. This disturbance results in the presence of only opportunistic Stage 1 infauna. Elsewhere in the upper harbor, the infauna appeared to be able to keep up with the rates of deposition, based on the widespread evidence of Stage 3.

Middle Portland Harbor

The distribution of infaunal successional stages in middle Portland Harbor is presented in Figure 3-4c. This river segment was dominated by Stage I fauna. Stage 3 fauna were present only at the southern, upstream area that was transitional from the upper harbor and at isolated nearshore areas that were depositional. These fine-grained, nearshore areas appear to be the only regions within this river segment that did not undergo frequent physical disturbance. Unlike the upper harbor, where the presence of Stage 1 fauna in the main channel was attributable to rapid deposition, the presence of Stage 1 fauna in the middle Portland Harbor river segment appears to be related to physical disturbance from high current flows.

Lower Portland Harbor

The distribution of infaunal successional stages within lower Portland Harbor is presented in Figures 3-4c through d. Lower Portland Harbor was dominated by Stage 3 fauna, either by themselves or in association with Stage 1 infauna. Stage 3 fauna were observed in both main channel and nearshore sediments. Areas that exhibit Stage 1 infauna exclusively were the slips on the east shore of the river, the upstream portion of this segment, and the area where the Multnomah Channel converges with the Willamette.

The presence of Stage 3 fauna in this segment of river mirrored the distribution of fine-grained sediment and mean apparent RPD depths. Upstream, in the middle Portland Harbor segment, the sediments were coarse, indicative of high flows. The fines that were carried through the middle harbor segment appear to have been deposited in lower Portland Harbor segment, resulting in a fine-grained region that offers suitable habitat for the colonization of Stage 3 infauna. In the ship areas on the eastern shore, either vessel prop wash or perhaps restricted flow exchange may be contributing factors to the absence of Stage 3 fauna present.

3.3 LOWER WILLAMETTE RIVER RESULTS (RMS 3.0 TO 0)

This area extends from Transects 16 to 1, covering the portion of the river from Multnomah Channel to the Columbia River. Physical and biological parameters measured from the SPI images are mapped and presented in Figures 3-1 through 3-6. At stations that were analyzed in duplicate, both results are presented on the maps. The lower Willamette River Segment is subdivided into two distinct segments based on river morphology and SPI results. These segments are from RM 3.0 to 1.1 and from RM 1.1 to 0 (the Columbia River).

3.3.1 Lower Willamette River Physical Features

The physical parameters measured were prism penetration depth and sediment grain size. These parameters are mapped together in Figure 3-1d. In this figure, prism penetration depth and sediment grain size major mode from the lower Willamette River are mapped on the site bathymetric data.

Prism Penetration Depth

The distribution of prism penetration depths measured in the lower Willamette River are presented in Figure 3-1d. The greatest prism penetrations depth, those greater than 10 cm, were found in the mile 3.0 to 1.1 stretch of the lower Willamette River. From miles 1.1 to 0, prism penetration depths were less than 10 cm.

The deeper penetration depths in the mile 3.0 to 1.1 segment of the Lower Willamette River indicate that the sediments in this segment have less bearing strength (more water-rich) than those at the mouth of the river (the 1.1 to 0 mile segment).

Sediment Grain-Size

The distribution of sediment grain size in the lower Willamette River is presented in Figure 3-1d. The 3.0 to 1.1 mile segment of the Lower Willamette River is dominated by fine-grained sediments (>4 phi; silts and finer) in both the channel and nearshore areas. Isolate channel stations are composed of fine sands but the majority of the channel is fine-grained. In the nearshore areas, only the shallowest, near-bank stations are composed of sands. Both the eastern and western banks of the lower Willamette River exhibit ribbons of sands along the shoreline.

Representative images of fine-grained channel sediments from Stations 13C and 8D are presented in Figure 3-23. These images illustrate the fine-grained sediments found within the main channel in the mile 3.0 to 1.1 segment of the lower Willamette River. Along with grain-size, the stratigraphic features present in the images from these stations strongly suggest that these stations are net depositional. Representative images from nearshore Stations 16A and 11A are shown in Figure 3-24. The sediments at Station 16A are composed of sands and show evidence of physical reworking. This station is located in the broad, shallow bank area where the Multnomah channel empties into the Willamette River and is likely subject to wind-generated waves in addition to currents from river flow. Station 11A exhibits depositional, fine-grained nearshore sediments that have characteristics that are shared with many of the nearshore sediments along the entire Willamette River study area.

From mile 1.1 to 0 in the Lower Willamette River, the sediments are fine sands (4-3 phi). This segment of river is coarser-grained than the mile 3.0 to 1.1 segment. These fine sands are also firmer (less porosity) than the sediments in the mile 3.0 to 1.1 segment. Representative SPI images from Stations 3D and 1D, located within the main channel, are presented in Figure 3-25. These images show the firm, moderately sorted sands that comprise this river stretch. Representative images showing nearshore sediments from Stations 4A and 2A are shown in Figure 3-26. These stations are composed of fine sands and are different from nearshore stations upstream.

3.3.2 Lower Willamette River Chemical and Biological Features

Chemical and biological parameters measured from SPI images include apparent RPD depth, area of the sediment column containing sedimentary methane, and the infaunal successional stage.

Redox Potential Discontinuity

The distribution of apparent RPD depths in the lower Willamette River is shown in Figure 3-2d. Sediments within the mile 3.0 to 1.1 segment of the lower Willamette River exhibit deep, well-developed apparent RPDs that are often in excess of 6 cm. A distinct group of sediments with deep, greater than 6 cm, RPDs are found in the central channel, from miles 3 to 1.8. Another area that has deep surface oxidized layers, between 3 and 6 cm, surrounds the group of sediments with RPDs greater than 6 cm. In both of these areas, the RPDs are influenced by recent deposition of oxidized, fine-grained sediment. Figures 3-23 and 3-24 show images from this stretch of river that exhibit RPDs made deeper by depositional processes. It should be noted that the RPDs in this region are greater than those observed upstream in the lower Portland Harbor segment and greater to those observed downstream at the mouth of the Willamette. This reflects the apparently higher depositional rates in this segment (RM 3.0 to 1.1) of the lower Willamette River.

RPDs in RM 1.1 to 0.0 segment of the lower Willamette River are less than those observed upstream but are still generally high. There is a band of stations in the main channel that have 3-6 cm deep surface oxidized layers. In the eastern nearshore areas RPDs are less than 3 cm. Figures 3-25 and 3-26 show stations located in the main channel and nearshore areas segment of the lower Willamette River, respectively. Comparing Figures 3-25 and 3-26 to those upstream (Figures 3-23 and 3-24), it is clear that RPDs are not as thick and are influenced less by depositional processes and more by biological processes (i.e. burrowing and bioturbation).

Sedimentary Methane

The distribution of sedimentary methane in lower Willamette River sediments is presented in Figure 3-3d. Methane presence in the lower Willamette River is restricted to isolated areas. A small area that extends from the main channel to the eastern bank at RM 2.9 has methane present at very small quantities (< 1.5 cm^2). Other areas with methane were isolated one to two station clusters that were primarily located in the nearshore. The small, localized distributions and relatively low concentrations are noteworthy. The apparently lower methane production rates in sediments in the lower Willamette River (compared to upstream depositional areas) suggests lower downstream inputs of labile organic matter and/or higher sediment porewater mixing/flushing rates.

Infaunal Successional Stage

The distribution of infaunal successional stages in the lower Willamette River is presented in Figure 3-4d. The mile 3.0 to 1.1 segment is dominated by the presence of deep-dwelling, long-lived, Stage 3 infauna. SPI images showing Stage 3 infauna in the main channel and the nearshore environments are shown in Figures 3-23 and 3-24 (Stations 13C and 11A respectively). Stage 3 infauna were absent in the nearshore area at the confluence of the Willamette River and the Multnomah channel and in the main channel from RMs 2.3 to 1.5. Representative images showing only Stage 1 and 2 faunal assemblages are presented in Figures 3-23 and 3-24 (Stations 8D and 16A, in the channel and nearshore environments respectively).

In the mile 1.1 to 0 segment, Stage 1 and Stage 2 infauna dominate with Stage 3 infauna present at isolated stations. Representative images from this stretch of river are shown in Figures 3-25 and 3-26. Of note is the appearance of Stage 2 infauna, specifically tube-dwelling amphipods (possibly *Corophium sp*.), in the lower Willamette River. These amphipods are seen nowhere else in the river and presumably reflect Columbia River influence. In the marine/estuary successional sequence (Rhoads and Germano 1982, 1986), the presence of these amphipods denotes a Stage 2 community and is considered intermediate between Stage 1 and Stage 3 infaunal assemblages. Representative images that show colonies of tube-dwelling amphipods are presented in Figures 3-23 (Station 8D) and 3-25 (Stations 3D and 1D).

Physical and Biological Processes

Maps of physical and biological processes evident in SPI profiles from the lower Willamette River are presented in Figures 3-5d and 3-6d. The upper portion of the lower Willamette River, miles 3.0 to 1.1, is very similar to the lower Portland Harbor segment, miles 5.1 to 3.0. Both areas reflect the widening of the river and subsequent deposition associated with reduced flow velocities. The physical and biological features observed in these river segments (miles 5.1 to 1.1) are related to river morphology and flow velocities with localized modifications associated with riverbed topography or shoreline perturbances.

The mile 1.1 to 0 segment of the Lower Willamette River shows evidence of Columbia River influence. The physical processes appear to be dominated by Willamette River flow and morphology, however, unlike other parts of the river, the biological community is not governed solely by Willamette River dynamics. The presence of tubicolous amphipods seen nowhere else in the river, appear to reflect the superposition of Columbia River water properties into the Lower Willamette River.

4.0 DISCUSSION

4.1 RIVER DYNAMICS

As presented in Section 3, the SPI-surveyed portion of the Lower Willamette River was divided into three segments based on the objectives of the study, the upper Willamette River (RM 15.7 to 9.7), Portland Harbor (RM 9.7 to 3), and the lower Willamette River (RM 3 to 0). The benthic conditions inferred from the SPI images throughout this area in water depths greater than 20 feet Columbia River Datum (CRD, the main river stem or navigation channel) are primarily related to physical controls, specifically river shape, width and flow. These factors appear to govern the types of sediments seen within the main channel and the associated substrate stability and heterogeneity. In turn, these substrate characteristics appear, in large part, to control benthic community structure.

Overlays of the major SPI parameters point to seven major "benthic zones" in the deeper portions of the Willamette River from Ross Island to the Columbia River. These are shown in Figure 4-1. Within each zone, gross benthic conditions are relatively uniform throughout the area mapped. The nearshore zone, all surveyed river bed areas less than 20 feet depth CRD along both margins of the river, represents an eighth benthic zone (Figure 4-1). Unlike the deeper zones, the nearshore zone is a mosaic of the benthic conditions observed throughout the river. The conditions observed at any particular location within the nearshore zone varies upstream and downstream as a function of small-scale variations in river morphology, dynamics, bank treatments, and river use.

The general characteristics of each benthic zone delimited in Figure 4-1 are summarized below.

4.2 MAIN CHANNEL ZONES

RM 15.7-11.0 (Chute)

This segment of river is dominantly erosional. From the southern tip of Ross Island (mile 15.7) to RM 11.0, the coarse-grained sediment, thinly developed RPDs and low prism penetration depths all attest to dynamic nature of the main channel through this reach. Fine-grained sediment is winnowed away by the current flow, leaving a firm, coarse-grained, sedimentary lag that is resistant to further sediment transport. The presence of gravel lags and sand ripples in the SPI images (Figure 3-7) illustrate the riverbed response to prevalent flows. The velocity of river flows is related to numerous factors including but not limited to flow volume, cross-sectional areas, slope, river shape and frictional drag associated with bottom morphology. Table 4-1 lists the cross-sectional areas of the Willamette River at ten of the SPI transects surveyed. Transects 81 and 75 are located in this "Chute" segment of river and have the two smallest cross-sectional areas (Table 4-1). This segment of river also lacks large meanders to slow flow,

thus current velocity is primarily related to flow volume and cross-sectional area (velocities increase with smaller cross-sectional areas, given constant flow volume).

RM 11.0 to 9.7 (Transition Zone)

From Transect 74 downstream to Transect 70, the river widens and cross-sectional areas increase and as a result flow velocities decrease. This relatively small stretch of the river represents the transition from the dynamic Upper Willamette River to the Portland Harbor segment.

RM 9.7 to 7.0 (Deposition Zone 1)

The SPI results indicate that the sediments in mile 9.7 to 7.0 segment of Portland Harbor are organic, methanogenic silts with deep apparent RPDs that have been thickened by deposition of oxidized fine-grained sediment. Transects 62 and 51 in this zone have large cross-sectional areas, nearly double the cross-sectional areas in the Upper Willamette River (Table 4-1). As the river widens and cross-sectional areas increase, the river flow velocities decrease and the ability of the river to entrain and transport sediment decreases resulting in the deposition of sediment in suspension. The 9.7 to 7.0 mile segment is highly depositional and materials that were in suspension in the upper Willamette River settle out of the water column in this stretch of Portland Harbor.

RM 7.0 to 5.1 (Transport Zone)

The RM 7.0 to 5.1 segment of river was characterized as static or erosional in Section 3.2. Transects 43 and 36, located in this segment of Portland Harbor have cross-sectional areas that are 63 to 70% less than those in the mile 9.7 to 7.0 segment (Table 4-1). As a result of the constricted river channel, flow velocities in this segment of river increase. Consequently, the sediments in this segment are coarser grained and show evidence of fine-grained sediment being winnowed from the sediment-water interface. This zone is not as dynamic as the upriver "Chute" (RM 15.7 to 11.0) and exhibits some localized depositional areas within the main body of the channel. The depositional areas are potentially related to bottom topography, perturbations of flow velocities, and variations in frictional drag.

RM 5.1 to 3.0 (Deposition Zone 2)

The SPI results indicate that the 5.1 to 3.0 mile stretch of the river is composed primarily of organic silts with deep, depositional, apparent RPDs. Similar to the Deposition Zone 1 (RM 9.7 to 7.0), the presence of this sediment type is related to decreasing river flow velocities associated with river widening (increases in cross-sectional area). Transect 30 is located in this zone and its cross-sectional area is greater than those observed immediately upstream in the Transport Zone (Table 4-1). Sediment that passed through the more dynamic RM 7.0 to 5.1, is likely depositing in the 5.1 to 3.0 mile segment as the flow velocities decrease and are no longer sufficient to entrain fine-grained sediment.

RM 3.0 to 1.1 (Deposition Zone 3)

The river segment from RM 3.0 to 1.1 is characterized by soft, organic silts and is also a depositional environment. The cross-sectional area in this zone (transect 14) is comparable to the cross-sectional areas observed in the two upstream depositional zones (Table 4-1). This zone is similar to Depositional Zone 2 in apparent flow regime, sediment type, and benthic community structure. In part, Deposition Zone 3 is separated from Depositional Zone 2 for site assessment purposes (the lower ISA boundary is RM 3.5) and because the Multnomah Channel enters the Willamette at the boundary of these zones (RM 3) and likely influences water and possibly sediment movement up and downstream of this point (Figure 4.1).

RM 1.1 to 0.0 (Columbia River Zone)

RM 1.1 to 0 segment is dominated by fine sands and silts. The fine sandy substrate is related to both the decreased river cross-sectional area (transect 4, Table 4-1) and influence from the Columbia River. It is important to note that until this segment of the river, the features observed within the Willamette are a function of river morphology and flow volumes. In this zone, the influence of the Columbia River modifies the Willamette River bottom and the biological community (e.g., tube-dwelling amphipods are seen only in this portion of the river, Figures 3-25 and 3-26).

Nearshore Zone (RM 15.7 to 0.0 at depths less than 20 feet CRD)

Representative images from nearshore stations throughout the Willamette River study area are presented in Figures 3-8, 3-9, 3-11, 3-14, 3-15, 3-18, 3-19, 3-22, 3-24, and 3-26. Many of the same features are present in the depositional nearshore stations throughout the river, independent of river segment or cross-sectional area. At river margins in general, the ratio of river bottom to flow volume increases, with frictional drag becoming a more important factor influencing flow velocities. Thus, nearshore areas tend to accumulate sediment as flow velocities are lessened in these areas. Many of the images from nearshore areas show laminar accumulations of sediment. Based on the SPI results from December 2001, it appears that the riverbed in many nearshore areas of the Willamette is predominantly stable, with sediments being deposited episodically (based on stratigraphic layering). Exceptions to this pattern are those isolated nearshore areas that have apparently been modified by non-flow related physical processes (e.g., wind-generated waves) and/or anthropogenic disturbance factors (e.g., prop-wash, nearshore construction).

4.3 COMPARISON TO PREVIOUS PORTLAND SHIP YARD SPI SURVEY

As part of a site characterization of the former Cascade General/Portland Ship Yard, a SPI survey was conducted in the spring of 1998 (SEA 1998). The sampling grid from this survey was superimposed on the sampling grid occupied during the 2001 SPI survey of the Willamette River to determine which stations

were co-located (Figure 4-2). The SPI measurements from ten station pairs that were co-located were compared (Table 4-2).

The purpose of comparing the results of the two sampling events was to evaluate potential changes over time in benthic conditions in the river and to assess the potential effects of seasonality on the measured SPI parameters. The Portland Ship Yard (PSY) survey was conducted during the spring freshet (April 1998) whereas the 2001 survey was conducted at period at the beginning of the rainy season (December 2001). It is important to note that the images from the 1998 survey were re-analyzed using the same methods employed during the analysis of the images from the 2001 survey.

The comparison of the two sampling events indicates that the sediments and benthic conditions documented during the 2001 survey are very similar to sediments observed during the 1998 survey (Table 4-2). Although penetration depths vary, different SPI cameras were utilized in each survey and the variation in penetration depth is a function of the each camera's frame and prism dimensions. Sediment grain size major mode and infaunal successional stages are nearly identical between the two surveys. The RPDs measured in each survey show a somewhat systematic difference, with RPDs being generally greater during the spring 1998 survey. The reason for the higher RPDs in the 1998 survey is not known, but is most likely related to sediment input during the high run-off season (fall-spring). The 2001 survey was conducted at the beginning of winter whereas the 1998 survey was conducted near the end of the wet-season.

The comparability of the two surveys indicates, that with the exception of the RPD, the SPI parameters measured are reflective of general conditions within the Willamette River sediments during the winter/spring portion of the year. It is important to note that the 1998 survey was conducted in the segment of Portland Harbor that was determined to be highly depositional based on the 2001 survey results. This segment of river appears to be depositional over the long-term (i.e. years to decades) and may represent the segment of river that is most likely to remain constant, in terms of sediment type and processes, over time. It is not known whether conditions change elsewhere in the river seasonally or from year to year, but it is likely that the overall patterns documented in this survey (i.e., the depositional, transport, and erosional regimes) are somewhat persistent in time as they are largely a function of river morphology.

4.4 UNCERTAINTIES ASSOCIATED WITH THE SPI DATA

As discussed above, the SPI survey results reported here reflect the near-surface benthic processes/dynamics that were occurring in the Lower Willamette in December 2001. Moreover, the distinct stratigraphic layering observed in the top 20 cm of the sediment column, both in nearshore and main channel environments, indicates that sediment transport regimes at many locations vary in time.

Consequently, an SPI survey conducted in late summer/fall might result in somewhat different distributions of the key mapped SPI features. Also, depending on longer-term (i.e., year-to-year) river stage changes, there are likely annual/decadal changes in river bottom characteristics. Nevertheless, the relative gradients in dynamics between various stretches of the river, as described in Section 4.1, are likely to be stable as these are controlled by overall river bed morphology.

SPI image analysis and interpretation was originally developed as a research tool to assess benthic conditions in nearshore marine environments (Rhoads and Germano 1982, 1986). It has since been used worldwide in marine environmental monitoring programs and major applications include dredged material disposal mapping, assessing organic enrichment gradients associated with outfalls, aquaculture, and hypoxic basins, and general benthic habitat quality surveys (Germano and Rhoads 1984, Diaz and Schaffner 1988, Revelas et al. 1987, Valente et al. 1992, and Bonsdorff et al. 1996). The interpretive criteria used in the analysis of images from soft-bottom marine environments are both ground-truthed and well-established (e.g., see Grizzle and Penniman 1991).

The SPI approach has been used much less frequently in freshwater environments, but a number of surveys, particularly in large lakes, have been conducted (McCall and Soster 1990, Shen and Boyer 1984, SEA 1997, 1998). The survey reported here represents the first extensive survey of large riverine system. The potential uncertainties associated with the use of this tool in this new setting are described below for key SPI parameters.

Physical Features: The interpretation of physical features, such as grain-size and stratigraphic patterns, is directly comparable between marine and freshwater settings. Recognition of these features is based on an understanding of general sedimentological processes regardless of the environmental setting. As expected, the Lower Willamette River images show a wider range of sedimentological features than a more uniform marine basin setting.

Chemical Features: As described in the report, methane is produced sooner in the sediment remineralization sequence in fresh water sediments than in marine systems. This is due to the relative lack of porewater sulfate in fresh water. Consequently, widespread sedimentary methane in fresh water systems, as was evident in some portions of the Willamette, is not necessarily an indication of chronic organic enrichment (as it would be in a marine setting).

The depth of the apparent RPDs in marine systems are generally a function of biogenic mixing depths and possibly also of bottom water oxygen levels. Many of the apparent RPDs depths measured in the Willamette appeared to be "physically" thickened by the recent deposition of oxidized, fine-grained sediment layers. Therefore, while gradients in RPD depths in marine settings are often indicative of gradients in benthic community types (reflecting gradients in

sediment reworking rates), the distribution of RPD depths observed in the Willamette survey could not be used to make such inferences.

Biological Features: There is a recognized sequence of benthic recolonization following both spatial and temporal disturbances in marine, fine-grained (muddy) areas (Pearson and Rosenberg 1978; Rhoads and Germano 1982, 1986). Rhoads and Boyer (1982) describe a generalized sequence in which dense aggregations of near-surface, tube-dwelling infauna recruit to an area immediately following a disturbance and are replaced in time by larger, deeper-dwelling subsurface feeding infauna. Distinctive biogenic features associated with these different infaunal assemblages can be seen in SPI images. This infaunal successional paradigm guides the interpretation of biological features (both benthic organisms and their biogenic structures) observed in the images and provides a framework for the ecological interpretation in nearshore marine systems.

While fewer SPI studies have been conducted in freshwater systems, some information on freshwater benthic responses to disturbance and non-marine SPI data sets does exist (McCall and Soster 1990; SEA 1997). Work in Lake Erie suggests that large numbers of ostracods and naid oligochaetes are early post-disturbance colonizers, followed by tube-dwelling chironomids and, later, deeper-dwelling deposit feeding tubicifid oligochaetes (McCall and Tevesz 1982). A SPI survey of Milwaukee Harbor, Wisconsin found that dense aggregations of oligochaetes were associated with areas of organic enrichment related to sewage effluent discharges (Shen and Boyer 1984). A SPI survey adjacent to a former log treating facility and active lumber mill in Lake Washington (Renton, Washington) found dense, oligochaete tube mats concentrated in a transitional zone between nearshore organically enriched areas and offshore ambient lake conditions (SEA 1997).

The biogenic features observed in the Lower Willamette images parallel those seen in previous fresh water settings. Distinct subsurface feeding pockets were seen at depth (10-20 cm) in the sediment column in fine-grained depositional (and inferred to be relatively stable) areas, while surface-dwelling tube-dwelling benthos (oligochaetes and amphipods) were seen in more dynamic settings. While no attempts were made to directly apply the marine successional paradigm to this survey, the same types of animal-sediment relationships were observed and mapped and the marine infaunal successional stage designations were used for convenience. However, the exact successional sequence, and perhaps more importantly, the disturbance levels and temporal scales associated with assemblage changes in Lower Willamette benthic environments is not known.

5.0 REFERENCES

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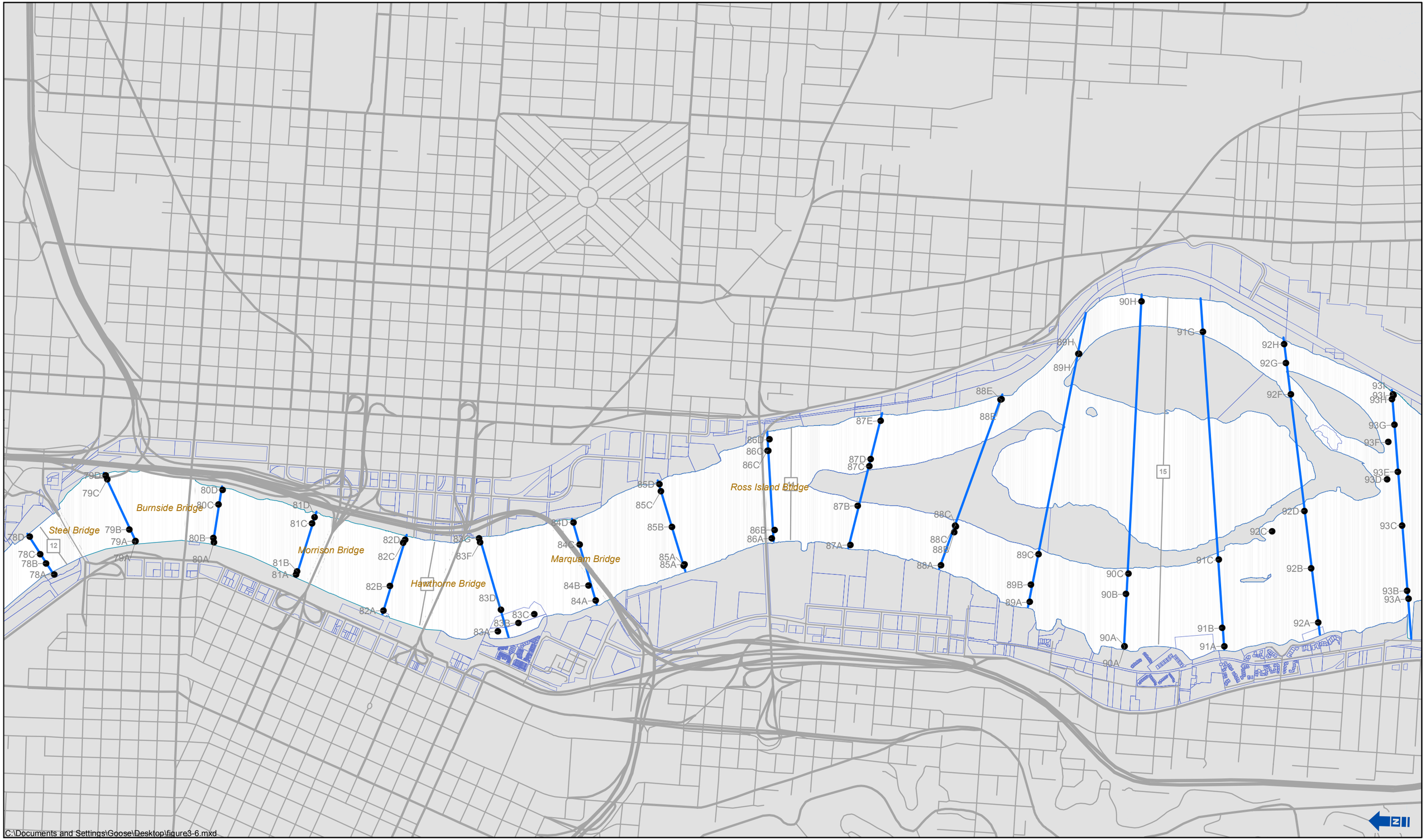

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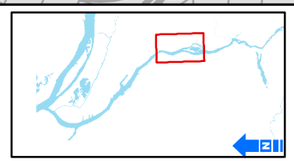
LWG Lower Willamette Group

Legend

- Station ID
- SPI Transects



FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
SEA shape point file created using GPS coordinates.

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SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 1-1a
Sheet 1 of 4

Legend

- Station ID
- SPI Transects

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SPI: Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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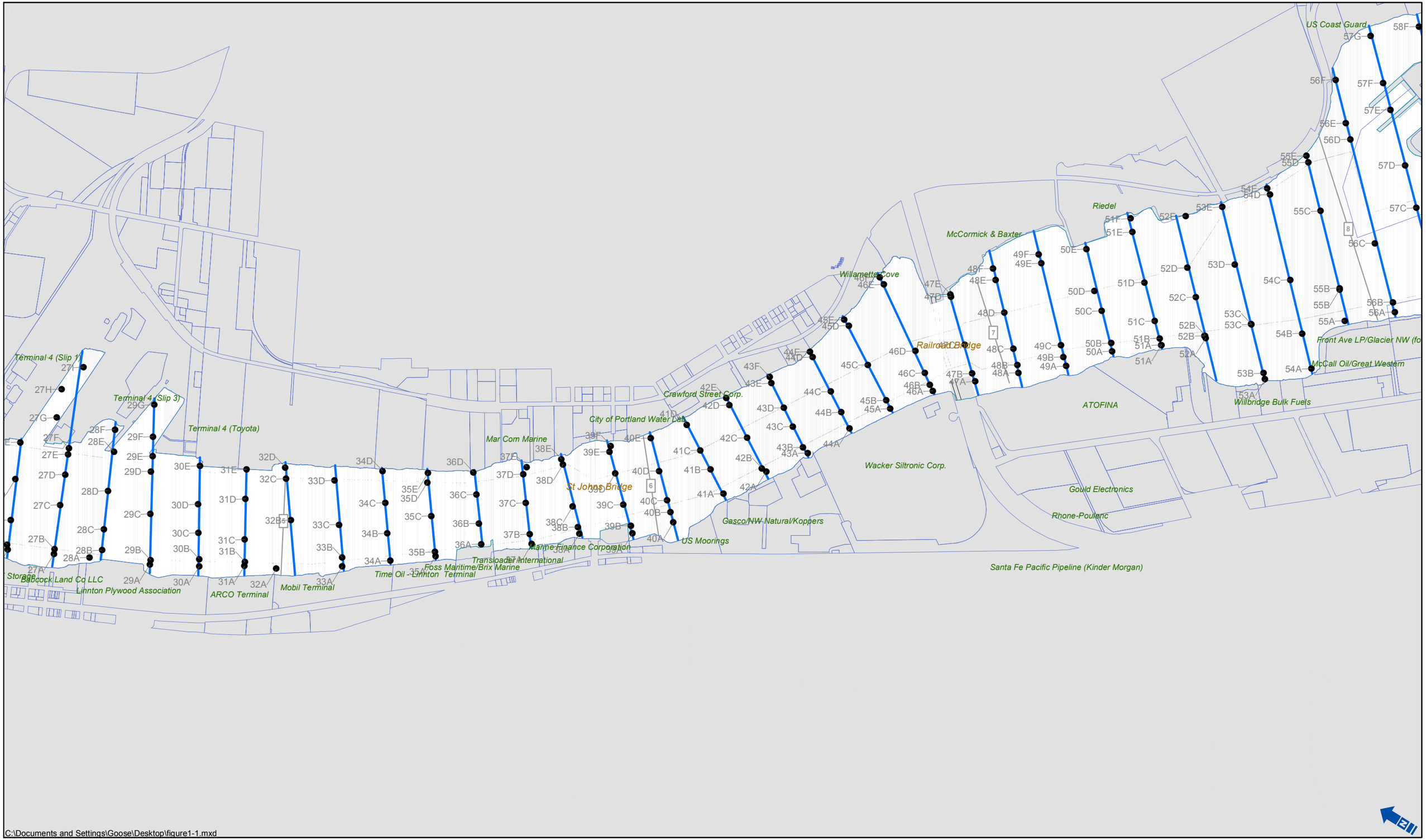
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 1-1b
Sheet 2 of 4



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LWG Lower Willamette Group

Legend

- Station ID
- SPI Transects

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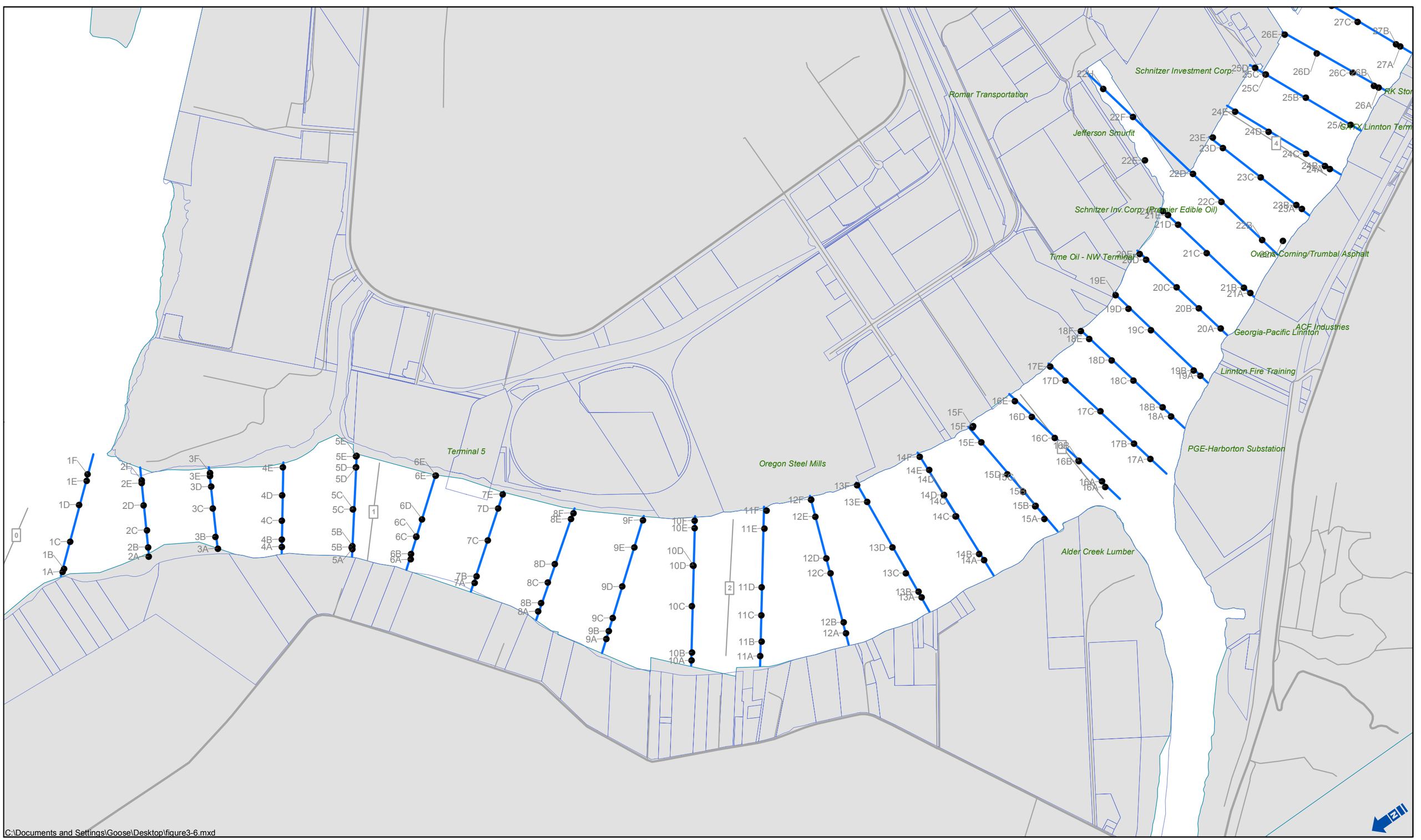
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 1-1c
Sheet 3 of 4



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TRIPLIN Environmental Associates

LWG Lower Willamette Group

Legend

- Station ID
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SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 1-1d
Sheet 4 of 4

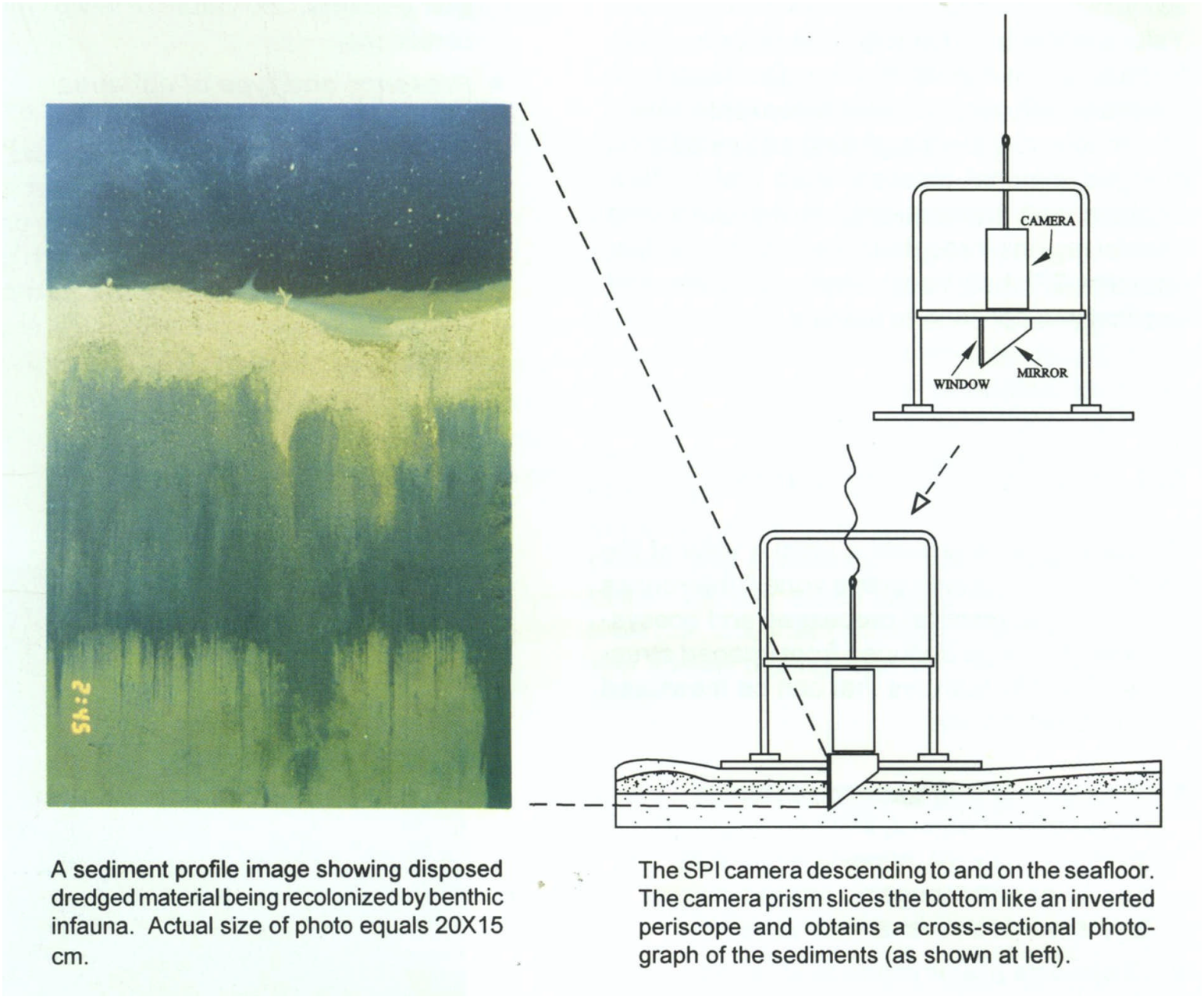
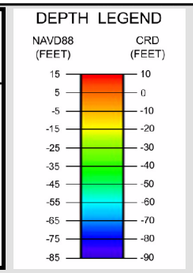
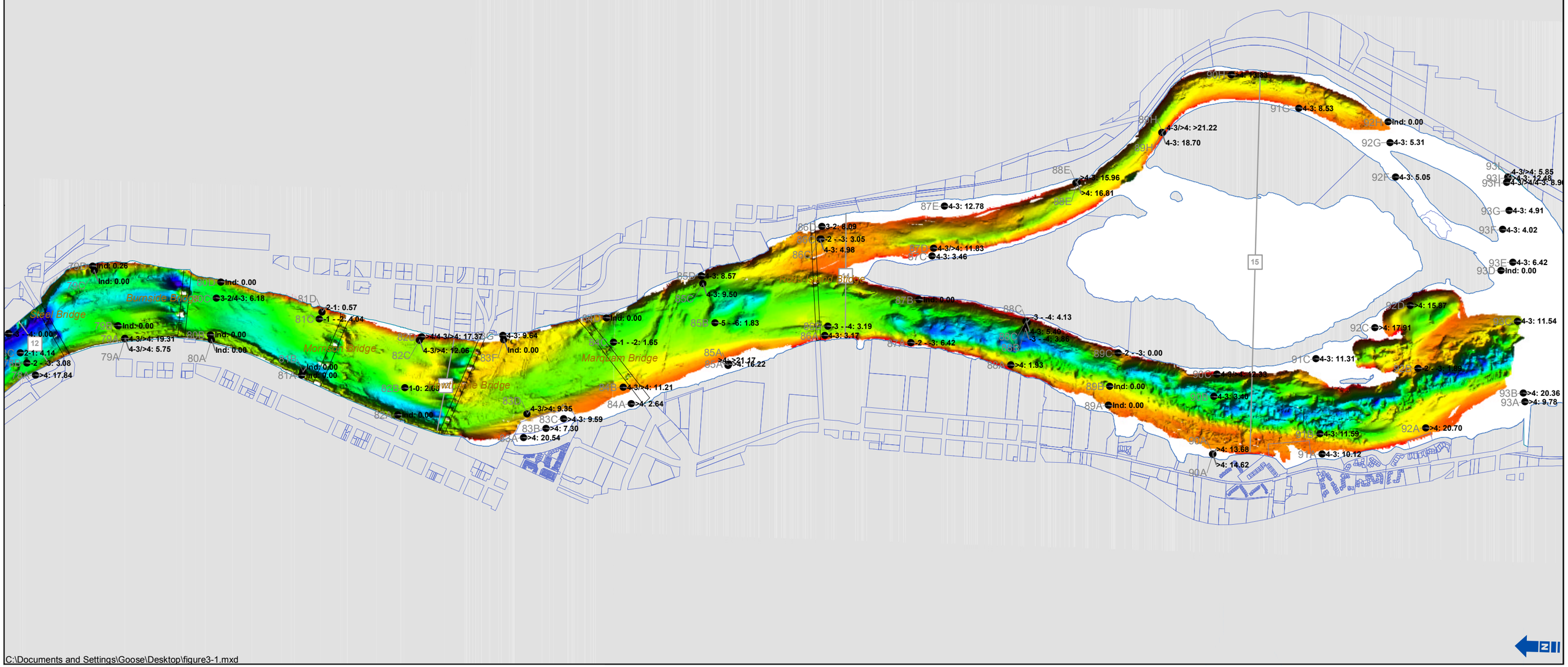


Figure 2-1. SPI Camera Schematic.

Phi Classes

Phi	Millimeters	Wentworth Size Class
-2.00	4.0000	Granule
-1.00	2.0000	Very coarse sand
0.00	1.0000	Coarse sand
1.00	0.5000	Medium sand
2.00	0.2500	Fine sand
3.00	0.1250	Very fine sand
≥ 4.00	0.0625	Coarse silt or finer
Ind		Indeterminate





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Legend

- Grain Size (phi units): Mean Penetration (cm)

FEATURE SOURCES:

Color background is a Hillside Image of 2001 Multibeam Bathymetric Survey.

Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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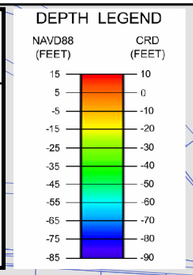
MULTIBEAM BATHYMETRIC SURVEY
with SPI Stations
Lower Willamette River

FIGURE 3-1a
Sheet 1 of 4

Phi Classes

Phi	Millimeters	Wentworth Size Class
-2.00	4.0000	Granule
-1.00	2.0000	Very coarse sand
0.00	1.0000	Coarse sand
1.00	0.5000	Medium sand
2.00	0.2500	Fine sand
3.00	0.1250	Very fine sand
≥ 4.00	0.0625	Coarse silt or finer
Ind		Indeterminate



US Coast Guard
Fred Devine Diving & Salvage
UPRR Albina
Terminal 2
Terminal 1 North
Terminal 1 South
Broadway Bridge
NW (former Lonestar Property)
Front Ave LP (Tube Forging)
Shaver Transportation
Lakeside Industries
Calbag Metals
Kittridge/Schnitzer
Gunderson
Equilon Enterprises LLC (Groundwater testing)
Christenson Oil

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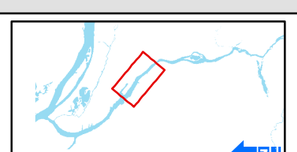
Legend

- Grain Size (phi units): Mean Penetration (cm)



FEATURE SOURCES:

Color background is a Hillside Image of 2001 Multibeam Bathymetric Survey.

Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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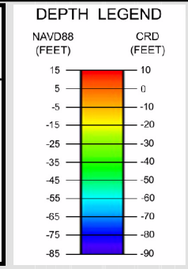
MULTIBEAM BATHYMETRIC SURVEY
with SPI Stations
Lower Willamette River

FIGURE 3-1b
Sheet 2 of 4

Phi Classes

Phi	Millimeters	Wentworth Size Class
-2.00	4.0000	Granule
-1.00	2.0000	Very coarse sand
0.00	1.0000	Coarse sand
1.00	0.5000	Medium sand
2.00	0.2500	Fine sand
3.00	0.1250	Very fine sand
≥ 4.00	0.0625	Coarse silt or finer
Ind		Indeterminate



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STRIPLIN Environmental Associates

LWG LOWER WILLAMETTE GROUP

Legend

- Grain Size (phi units): Mean Penetration (cm)

FEATURE SOURCES:

Color background is a Hillside Image of 2001 Multibeam Bathymetric Survey.

Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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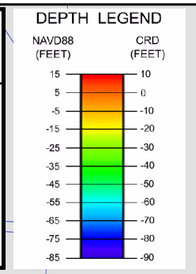
MULTIBEAM BATHYMETRIC SURVEY
with SPI Stations
Lower Willamette River

FIGURE 3-1c
Sheet 3 of 4

Phi Classes

Phi	Millimeters	Wentworth Size Class
-2.00	4.0000	Granule
-1.00	2.0000	Very coarse sand
0.00	1.0000	Coarse sand
1.00	0.5000	Medium sand
2.00	0.2500	Fine sand
3.00	0.1250	Very fine sand
≥ 4.00	0.0625	Coarse silt or finer
Ind		Indeterminate



Legend

- Grain Size (phi units): Mean Penetration (cm)

FEATURE SOURCES:

Color background is a Hillside Image of 2001 Multibeam Bathymetric Survey.

Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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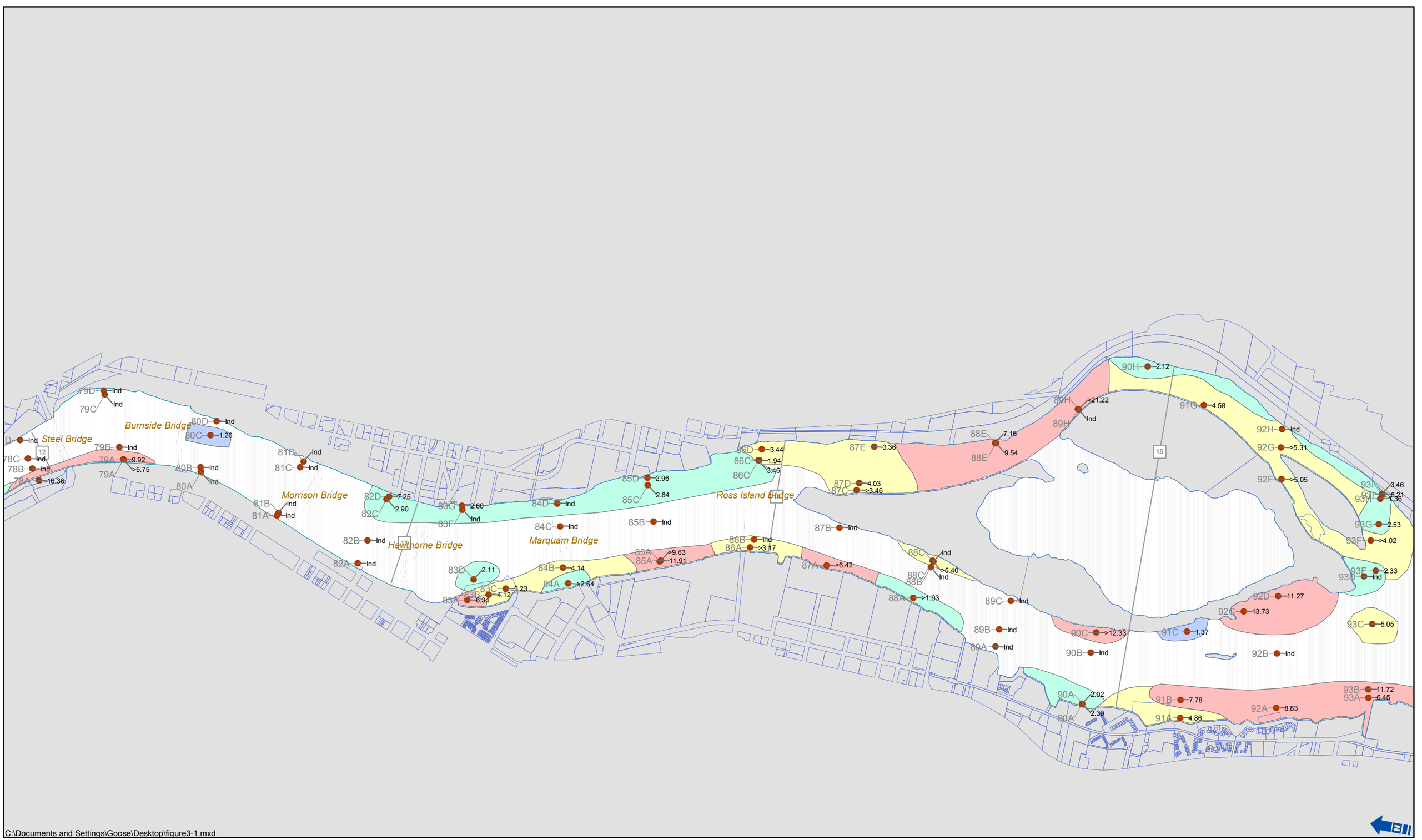
MULTIBEAM BATHYMETRIC SURVEY
with SPI Stations
Lower Willamette River

FIGURE 3-1d
Sheet 4 of 4



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TRIPLIN Environmental Associates

LWG Lower Willamette Group

Legend

RPD (cm)

RPD Contour Interval

- 0-1 (cm)
- 1-2 (cm)
- 2-3 (cm)
- 3-6 (cm)
- >6 (cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
SEA shape point file created using GPS coordinates.

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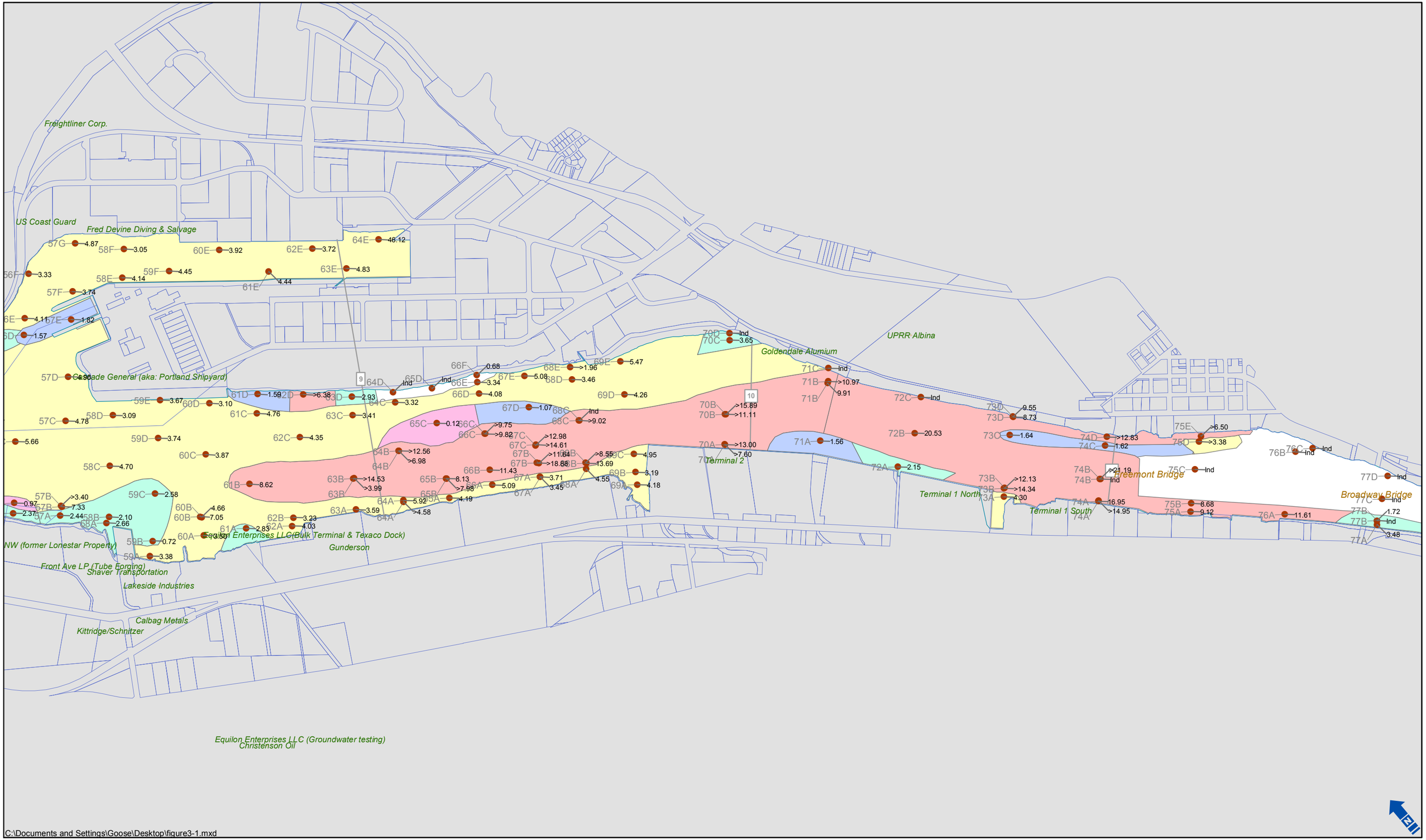
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-2a
Sheet 1 of 4



Legend

RPD (cm)

RPD Contour Interval

- 0-1 (cm)
- 1-2 (cm)
- 2-3 (cm)
- 3-6 (cm)
- >6 (cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI: Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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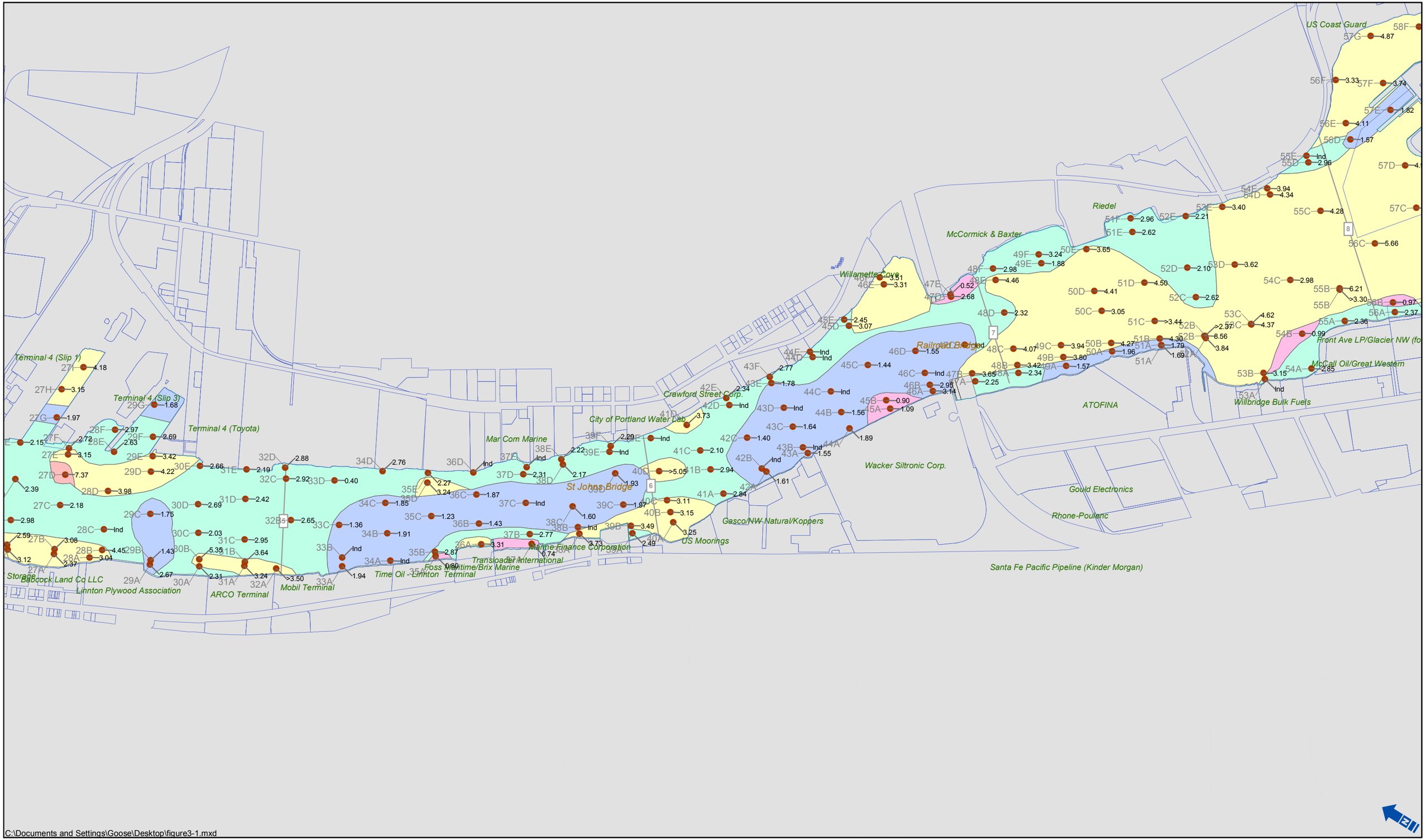
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-2b
Sheet 2 of 4



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Legend

RPD (cm)

RPD Contour Interval

- 0-1 (cm)
- 1-2 (cm)
- 2-3 (cm)
- 3-6 (cm)
- >6 (cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI: Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE

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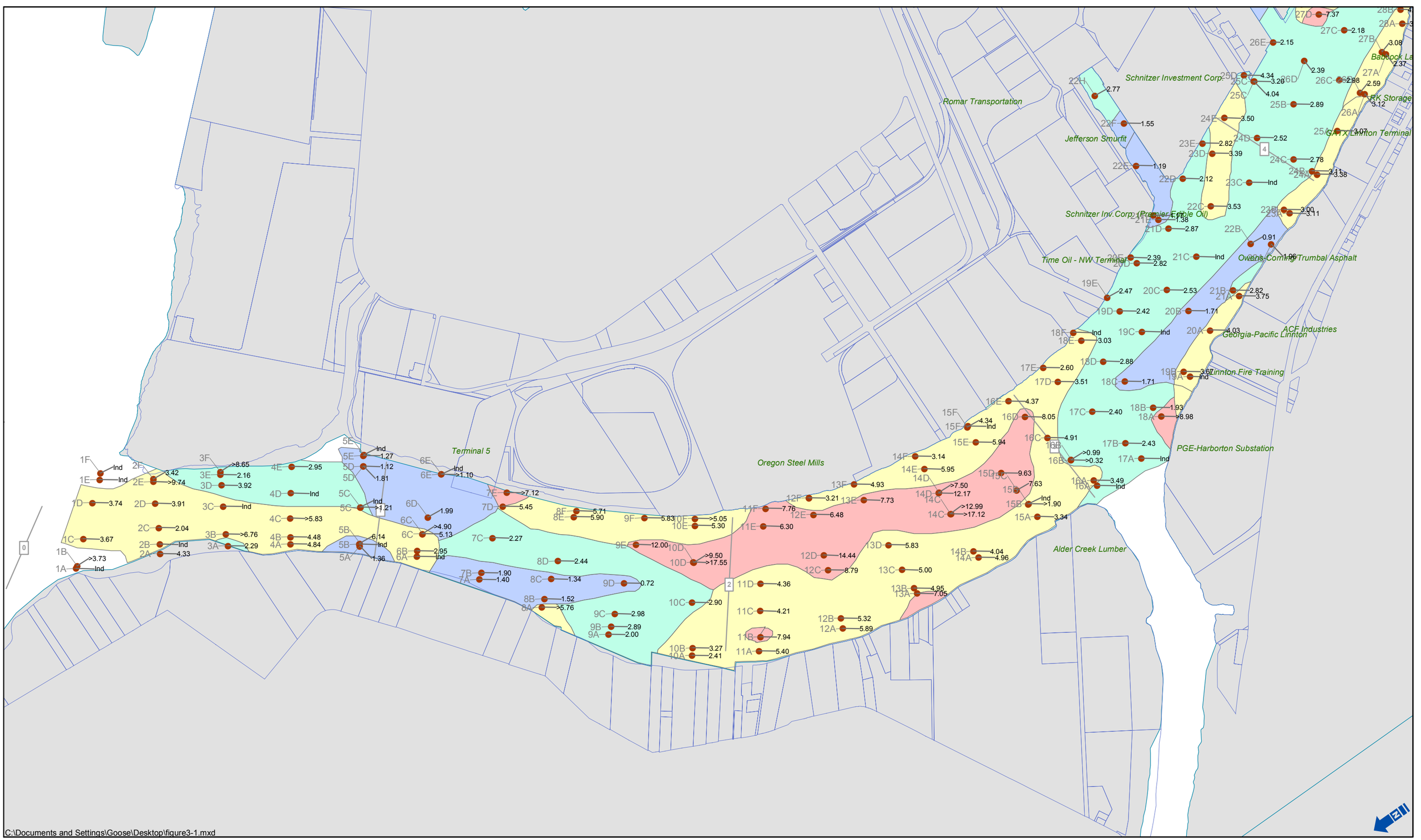
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-2c
Sheet 3 of 4



Legend

RPD (cm) **RPD Contour Interval**

- 0-1 (cm)
- 1-2 (cm)
- 2-3 (cm)
- 3-6 (cm)
- >6 (cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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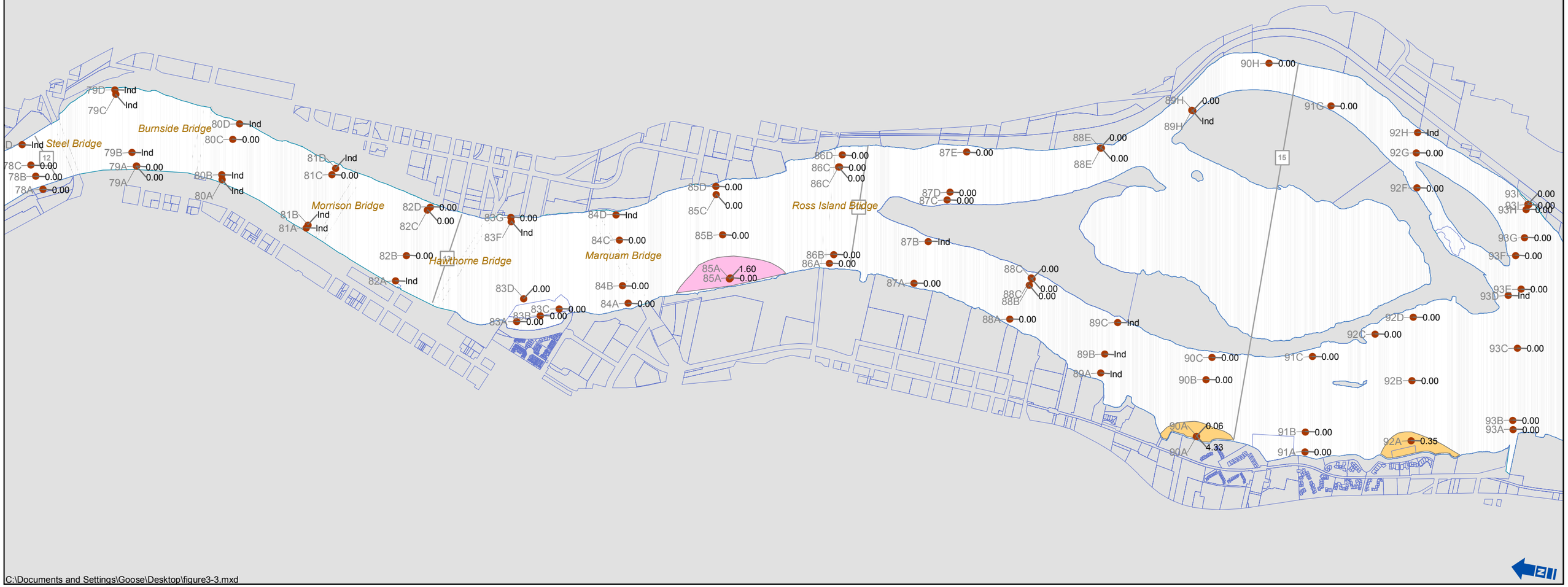
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-2d
Sheet 4 of 4



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Legend

- Methane Area (sq. cm.)

Methane Contour Interval

- 0-1(sq cm)
- 1-3 (sq cm)
- >3 (sq cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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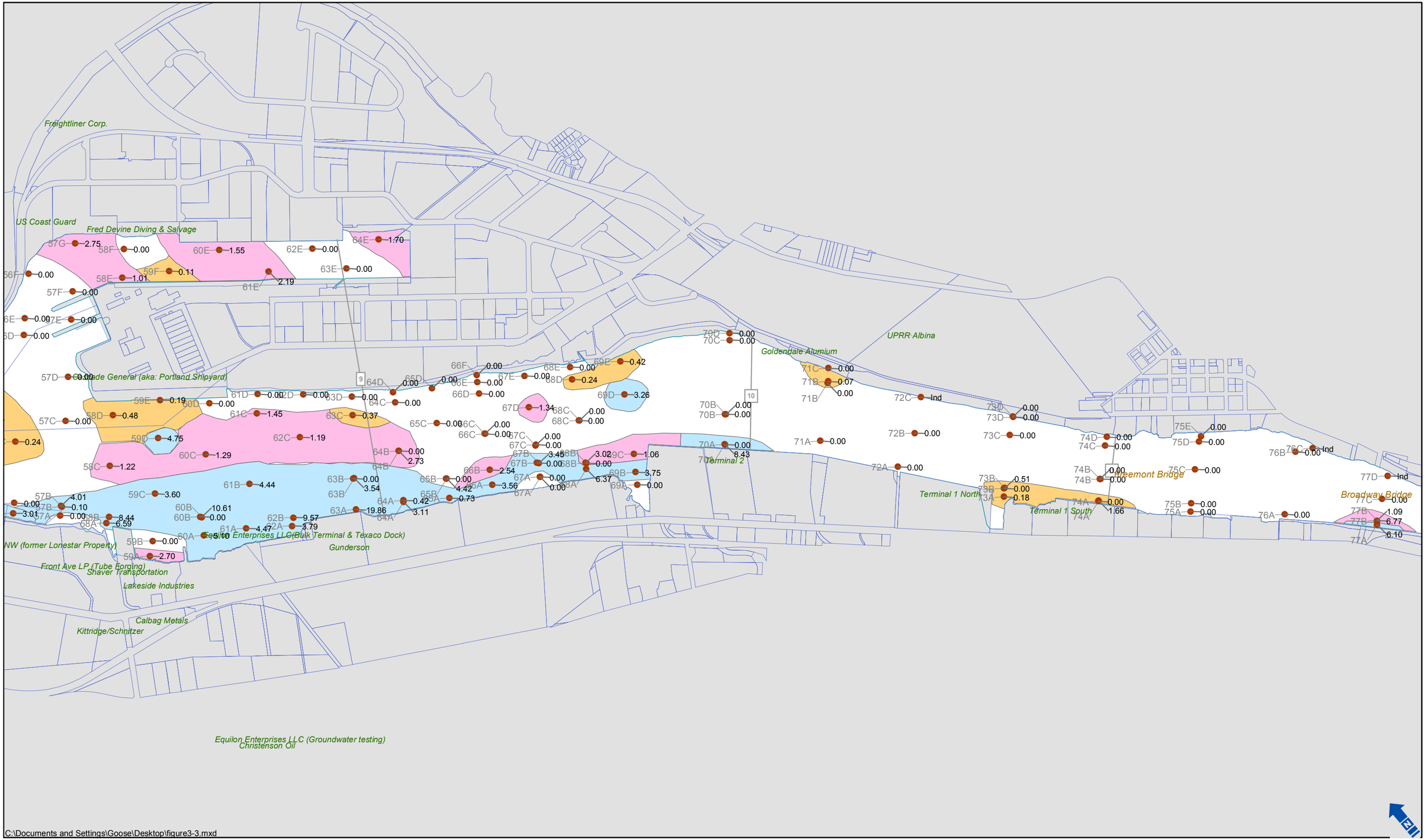
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-3a
Sheet 1 of 4



Legend

- Methane Area (sq. cm.)

Methane Contour Interval

- 0-1(sq cm)
- 1-3 (sq cm)
- >3 (sq cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI: Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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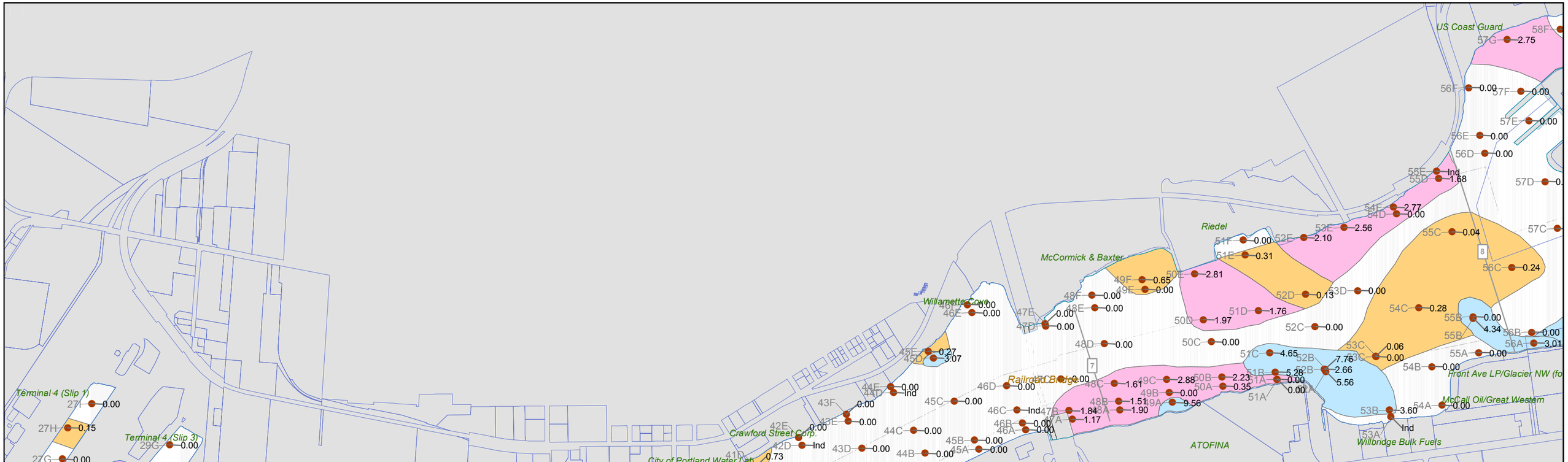
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-3b
Sheet 2 of 4



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TRIPLIN Environmental Associates

LWG Lower Willamette Group

Legend

- Methane Area (sq. cm.)

Methane Contour Interval

- 0-1(sq cm)
- 1-3 (sq cm)
- >3 (sq cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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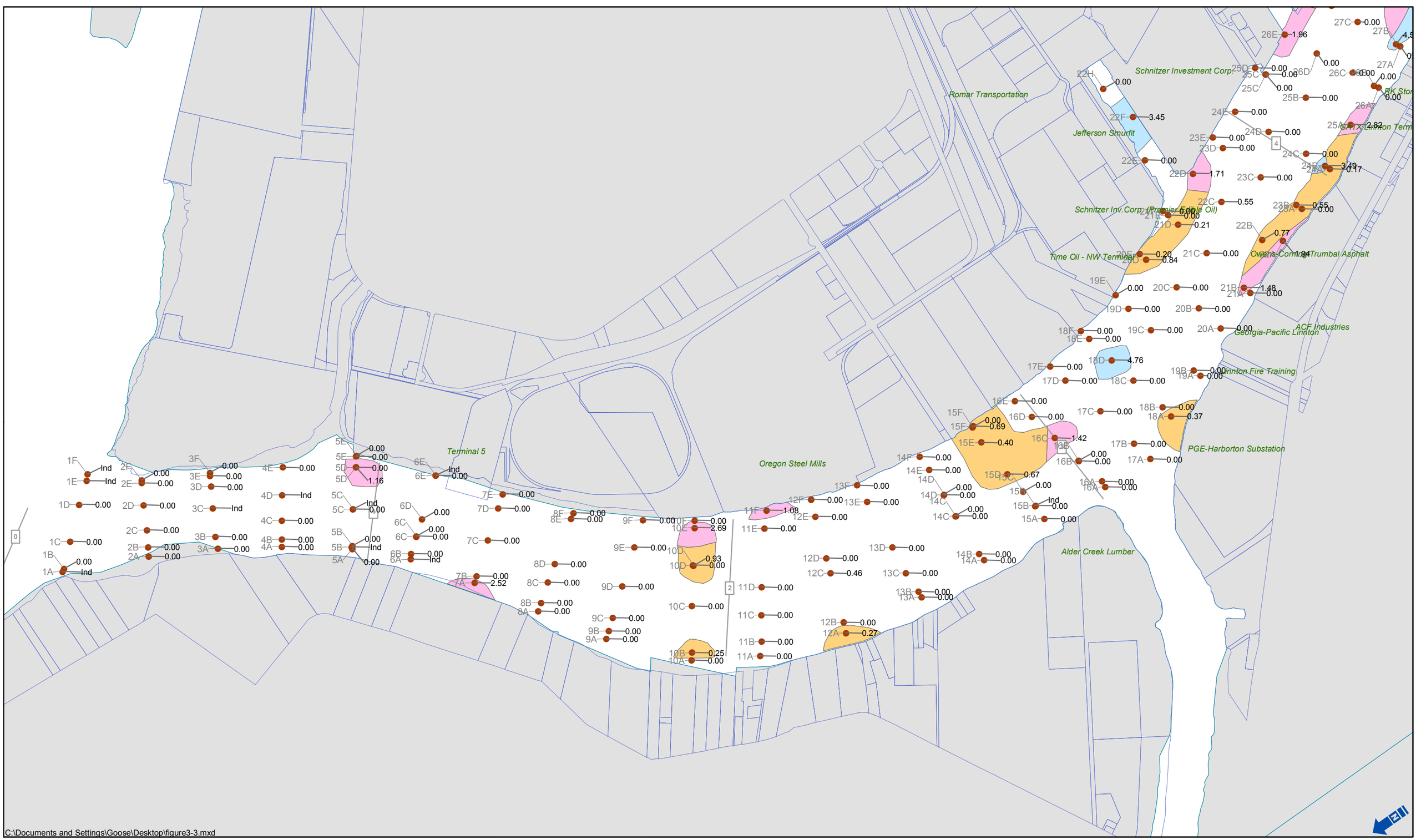
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-3c
Sheet 3 of 4



Legend

- Methane Area (sq. cm.)

Methane Contour Interval

- 0-1(sq cm)
- 1-3 (sq cm)
- >3 (sq cm)

Ind = Indeterminate

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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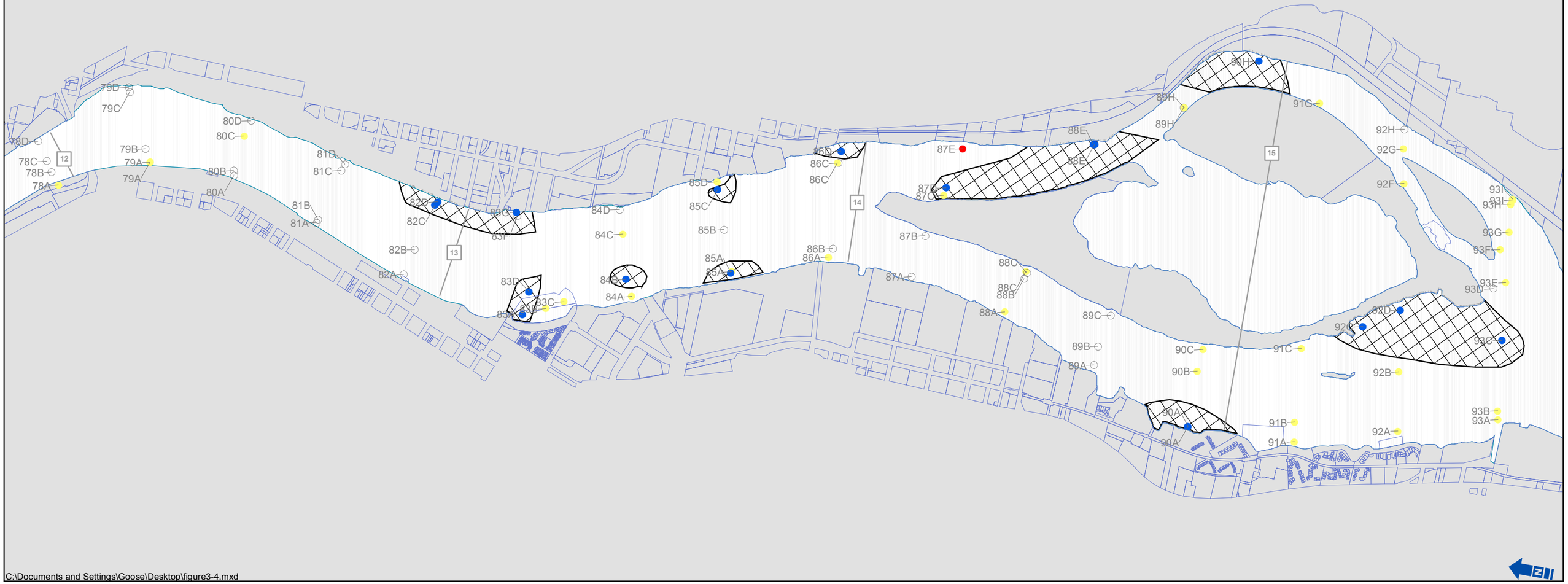
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-3d
Sheet 4 of 4



TRIPLIN Environmental Associates

LWG Lower Willamette Group

Legend

Infaunal Successional Stage

- 1
- 1->2
- 1 on 2; 2
- 2->3
- 2 on 3; 1 on 3 R; 1 on 3; 3
- Indeterminate

Stage

- Stage 3 Areas

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI: Sediment Profile Imagery Point Data: SEA shape point file created using GPS coordinates.

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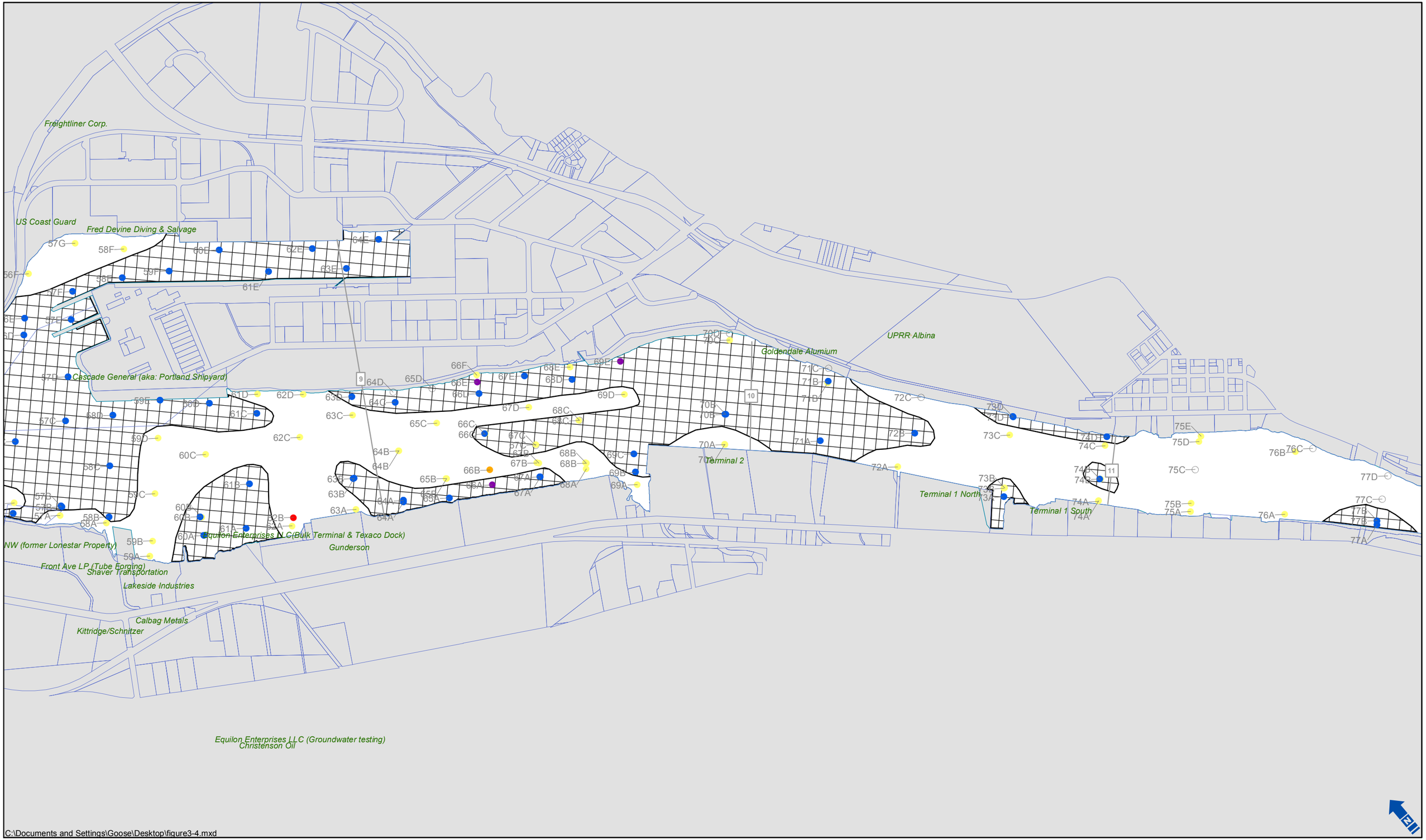
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-4a
Sheet 1 of 4



Legend

Infaunal Successional Stage

- 1
- 1->2
- 1 on 2; 2
- 2->3
- 2 on 3; 1 on 3 R; 1 on 3; 3
- Indeterminate

Stage

- Stage 3 Areas

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
SEA shape point file created using GPS coordinates.

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Map Creation Date: Monday, April 22, 2002 8:45 am
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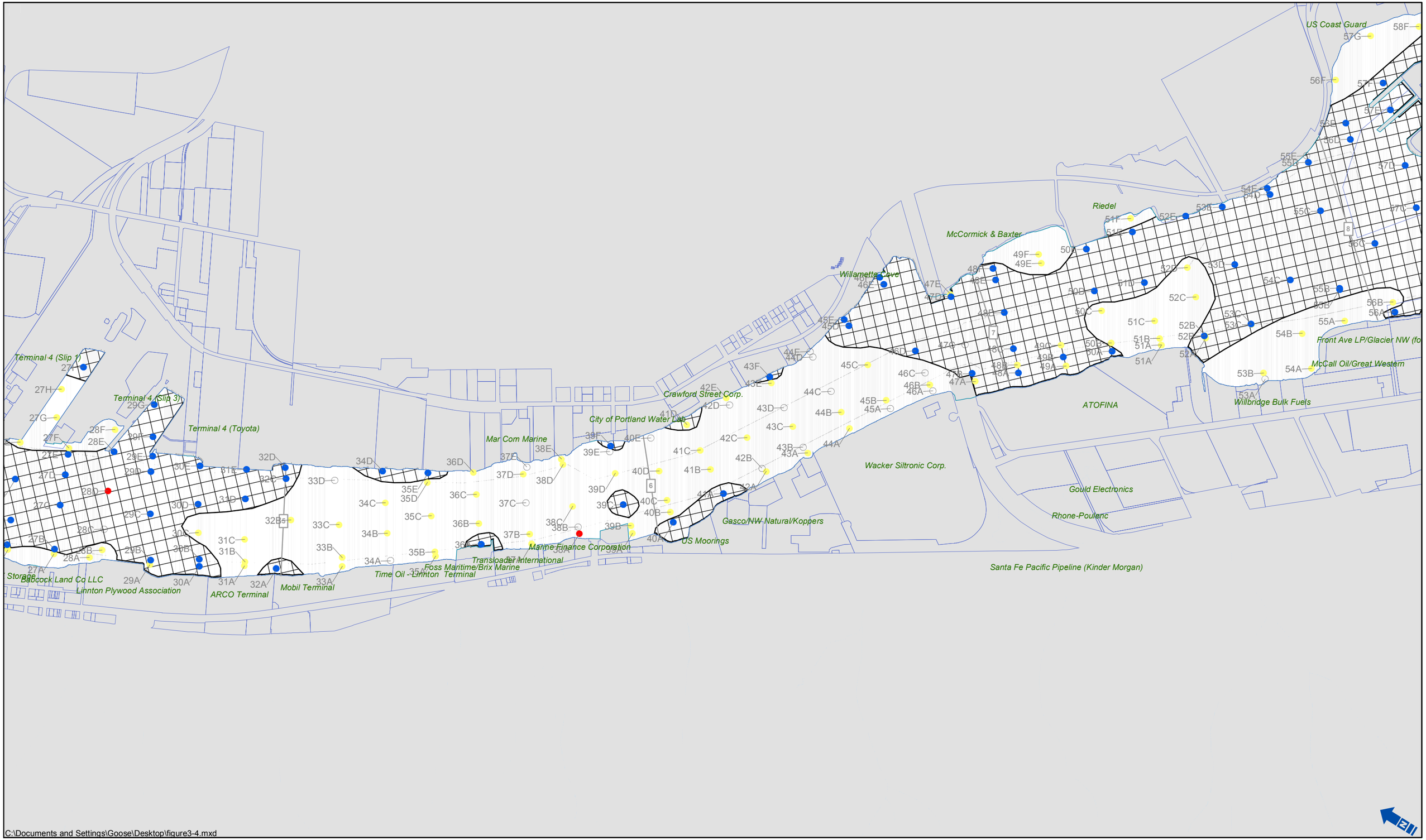
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-4b
Sheet 2 of 4



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Legend

Infaunal Successional Stage

- 1
- 1->2
- 1 on 2; 2
- 2->3
- 2 on 3; 1 on 3 R; 1 on 3; 3
- Indeterminate

Stage

- Stage 3 Areas

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
SEA shape point file created using GPS coordinates.

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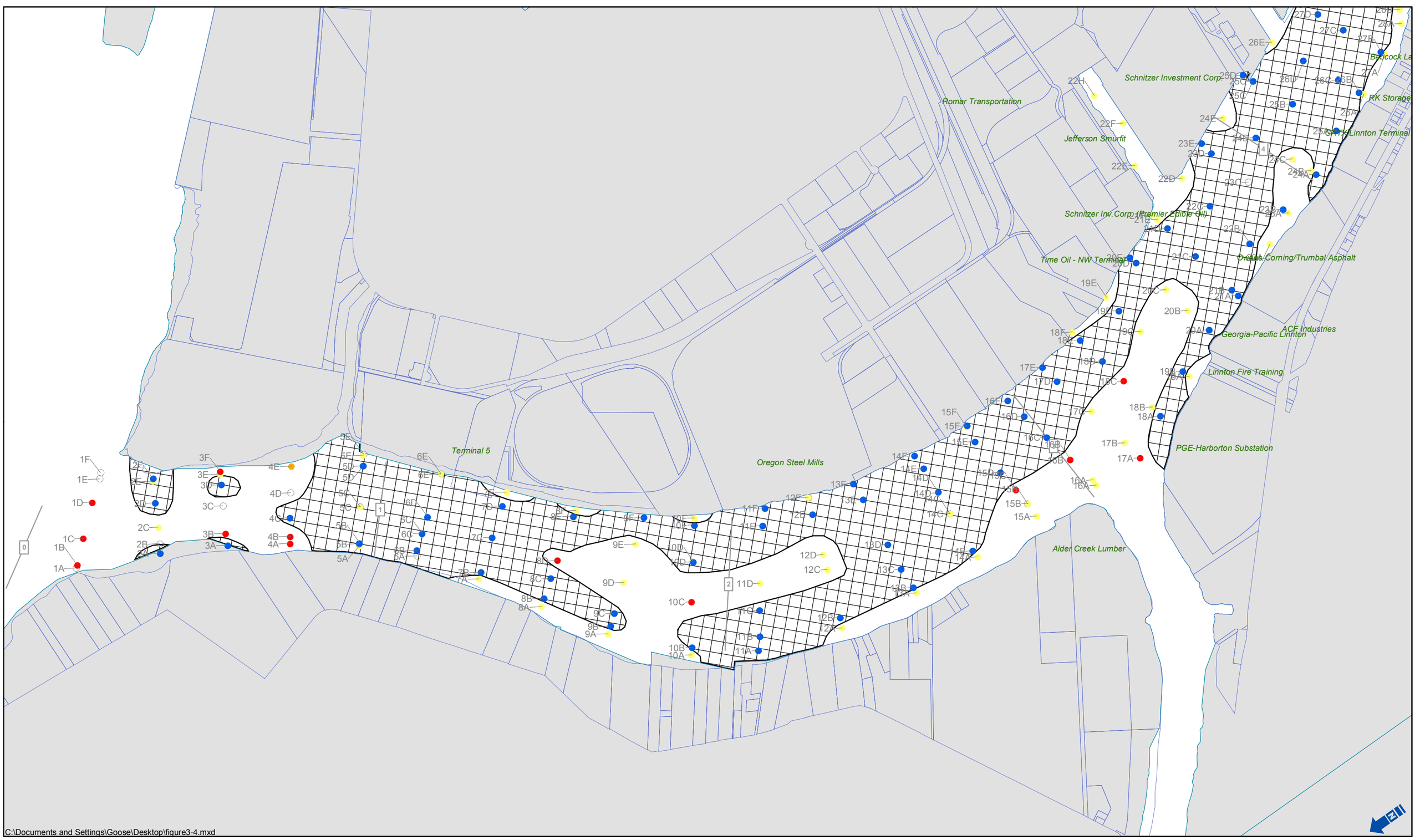
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-4c
Sheet 3 of 4



Legend

Infaunal Successional Stage

- 1
- 1->2
- 1 on 2; 2
- 2->3
- 2 on 3; 1 on 3 R; 1 on 3; 3
- Indeterminate

Stage

- Stage 3 Areas

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
SEA shape point file created using GPS coordinates.

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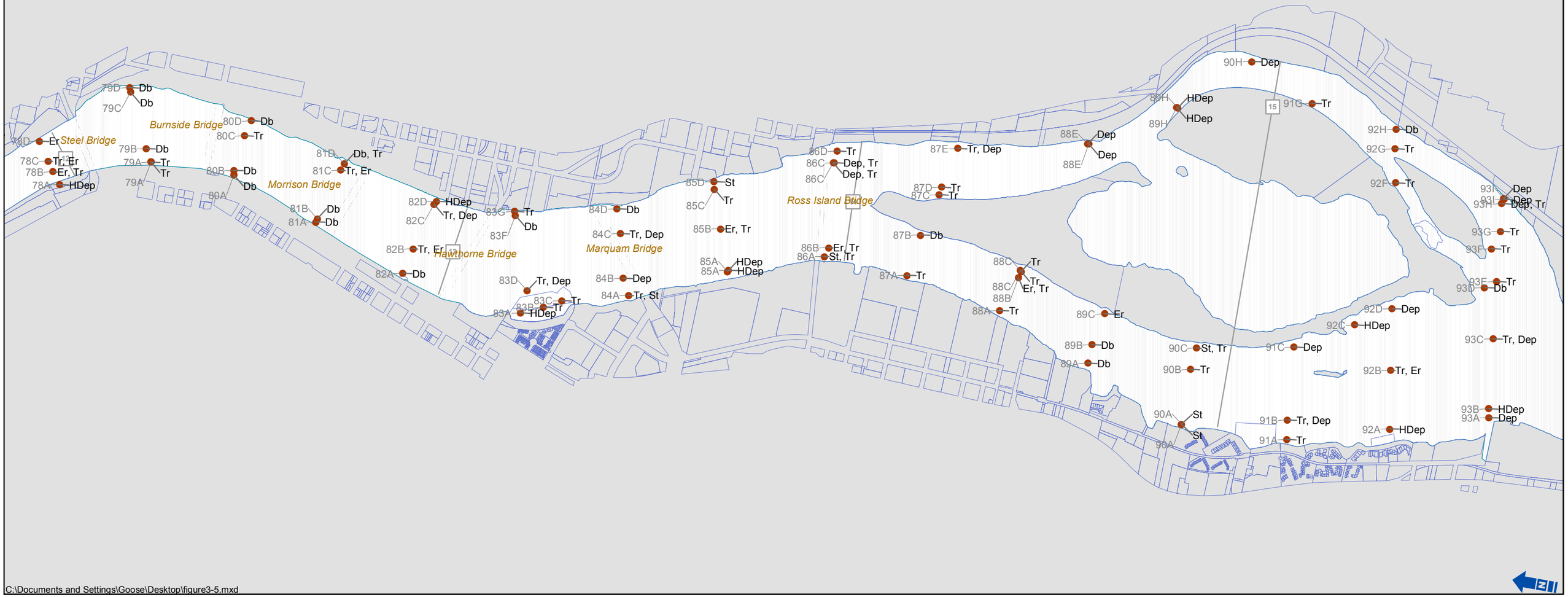
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-4d
Sheet 4 of 4

Physical Features

Dep = Depositional
HDep = Highly Depositional
Tr = Sediment Transport
Db = Debris
Er = Erosional
St = Static
Ind = Indeterminate
Dominant factor listed first followed by less important factor



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TRIPLIN Environmental Associates
LWG Lower Willamette Group

Legend

- Physical Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-5a
Sheet 1 of 4

Physical Features

Dep = Depositional
HDep = Highly Depositional
Tr = Sediment Transport
Db = Debris
Er = Erosional
St = Static
Ind = Indeterminate
Dominant factor listed first followed by less important factor

US Coast Guard
Fred Devine Diving & Salvage
Kinder Morgan (former Shell Terminal & Texaco Dock)
Gunderson
NW (former Lonestar Property)
Front Ave LP (Tube Forging)
Shaver Transportation
Lakeside Industries
Calbag Metals
Kittridge/Schnitzer
Equilon Enterprises LLC (Groundwater testing)
Christenson Oil
Goldendale Aluminum
UPRR Albina
Terminal 2
Terminal 1 North
Terminal 1 South
Freemont Bridge
Broadway Bridge

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TRIPLIN Environmental Associates
LWG Lower Willamette Group

Legend

- Physical Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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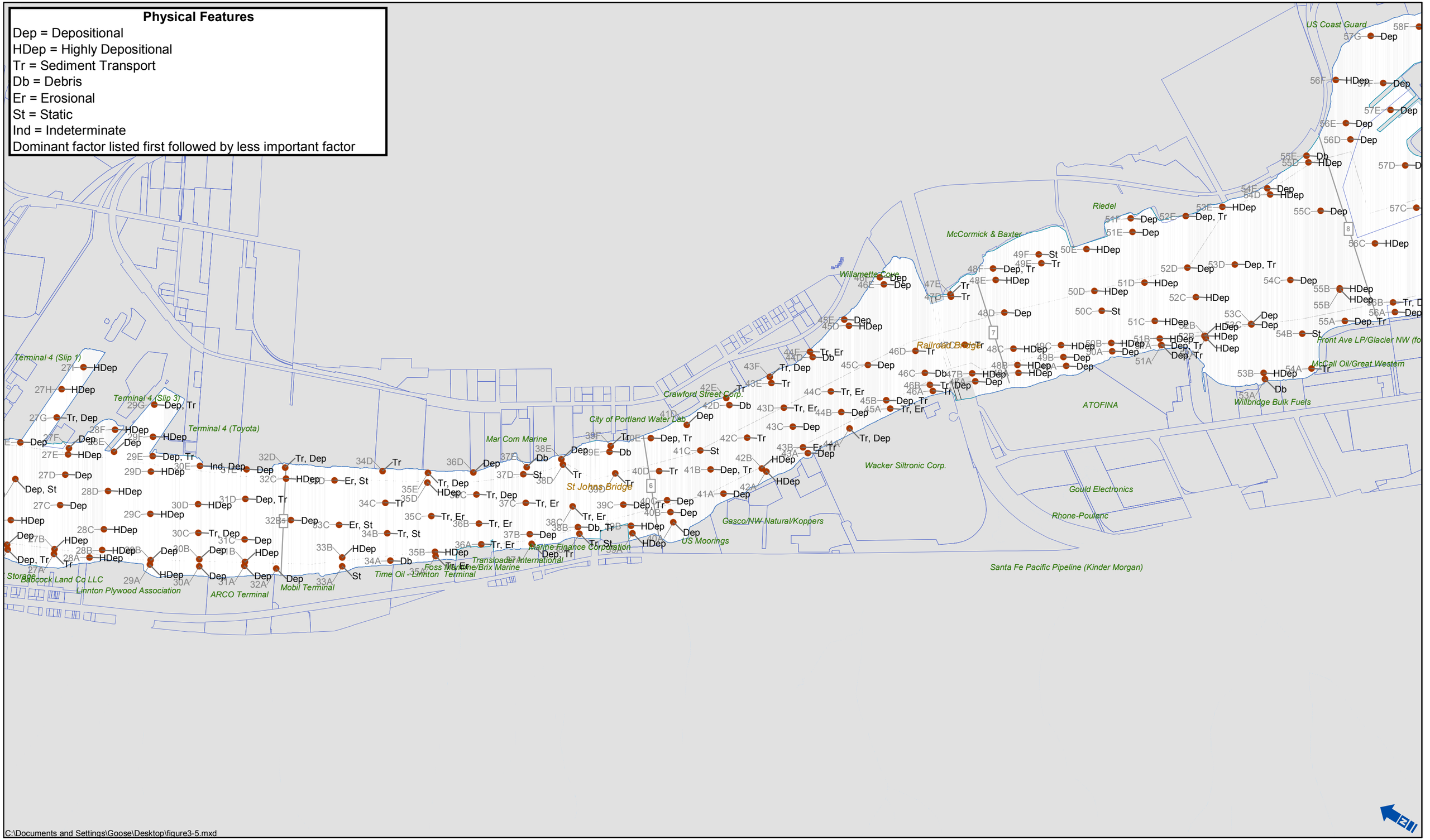
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-5b
Sheet 2 of 4

Physical Features

Dep = Depositional
HDep = Highly Depositional
Tr = Sediment Transport
Db = Debris
Er = Erosional
St = Static
Ind = Indeterminate
Dominant factor listed first followed by less important factor



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Legend

- Physical Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-5c
Sheet 3 of 4

Physical Features

Dep = Depositional
HDep = Highly Depositional
Tr = Sediment Transport
Db = Debris
Er = Erosional
St = Static
Ind = Indeterminate
Dominant factor listed first followed by less important factor

Romar Transportation
Schnitzer Investment Corp
Jefferson Smurfit
Schnitzer Inv.Corp.(Premier Edible Oil)
Time Oil - NW Terminal
Owens-Corning/Trumbal Asphalt
ACF Industries
Georgia-Pacific Linnton
Linnton Fire Training
PGE-Harborton Substation
Alder Creek Lumber
Oregon Steel Mills
Terminal 5
RK Storage
GATX Linnton Terminal
Babcock La

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TRIPLIN Environmental Associates
LWG Lower Willamette Group

Legend

- Physical Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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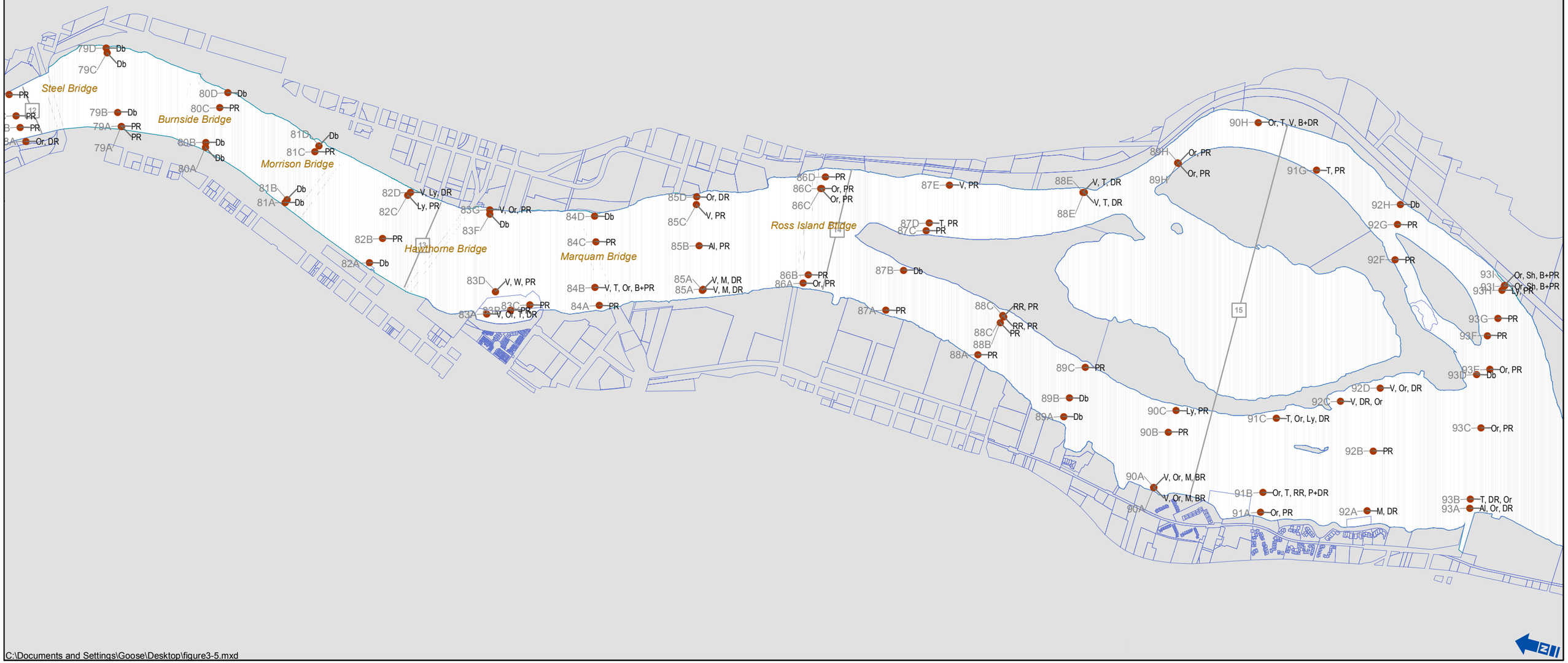
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-5d
Sheet 4 of 4

Biological Descriptors

AT = Amphipod Tubes
T = Tubes
WT = Worm Tubes
Al = Algae
Or = Organics, Organic Debris
Db = Debris
DR = Depositional RPD
BR = Biological RPD
PR = Physically generated RPD
Bu = Burrow
RR = Relict RPD
V = Void
M = Methane
W = Worm
P,B,+DR = RPD from a combination of sources with dominant force first
Ly = Layered
Sh = Shell
A = Animal



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Legend

- Biological Features

FEATURE SOURCES:

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SPI:
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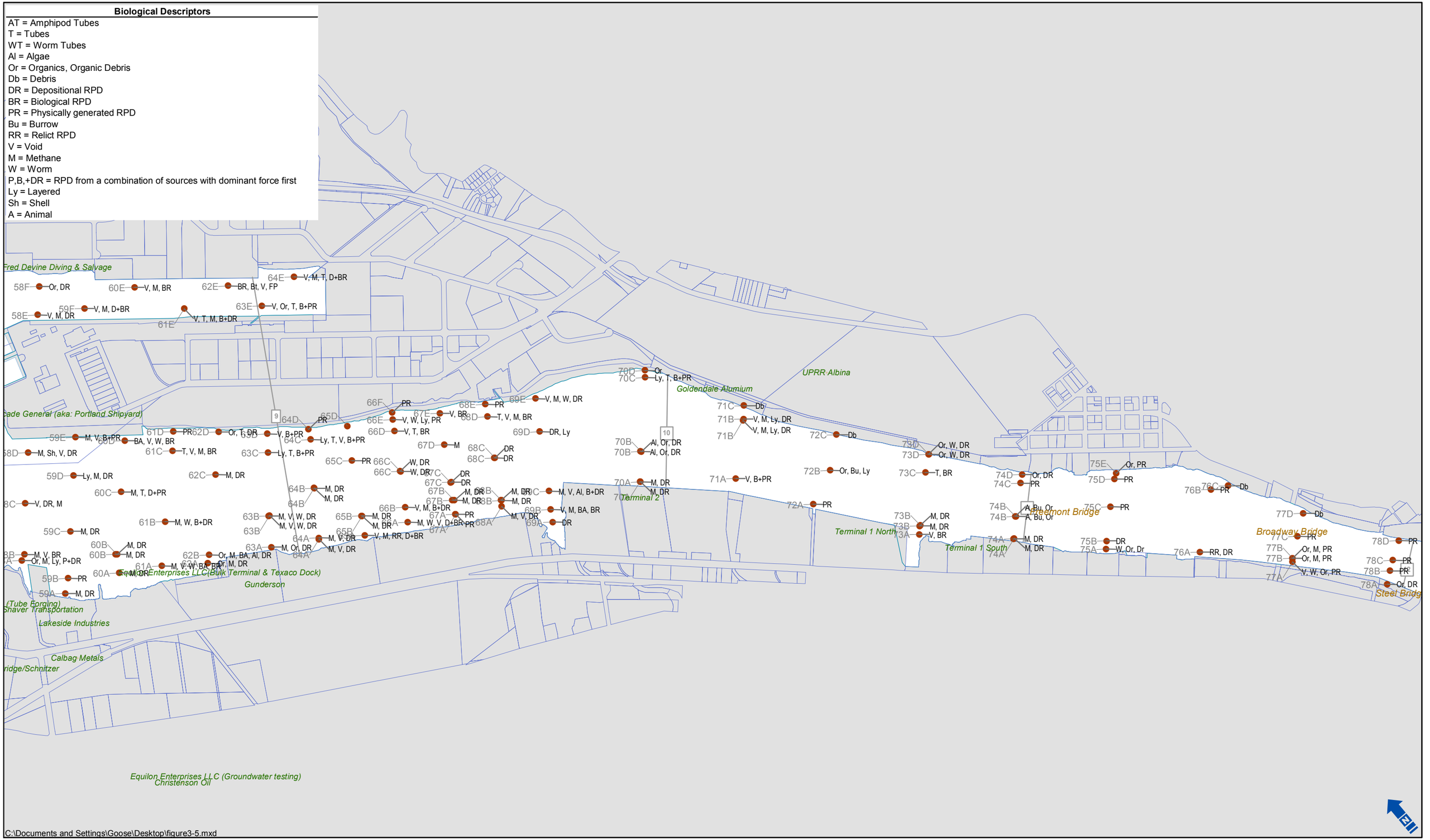
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-6a
Sheet 1 of 4

Biological Descriptors

AT = Amphipod Tubes
T = Tubes
WT = Worm Tubes
Al = Algae
Or = Organics, Organic Debris
Db = Debris
DR = Depositional RPD
BR = Biological RPD
PR = Physically generated RPD
Bu = Burrow
RR = Relict RPD
V = Void
M = Methane
W = Worm
P,B,+DR = RPD from a combination of sources with dominant force first
Ly = Layered
Sh = Shell
A = Animal



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TRIPLIN Environmental Associates
LWG Lower Willamette Group

Legend

- Biological Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries: Metro RLIS.

SPI:
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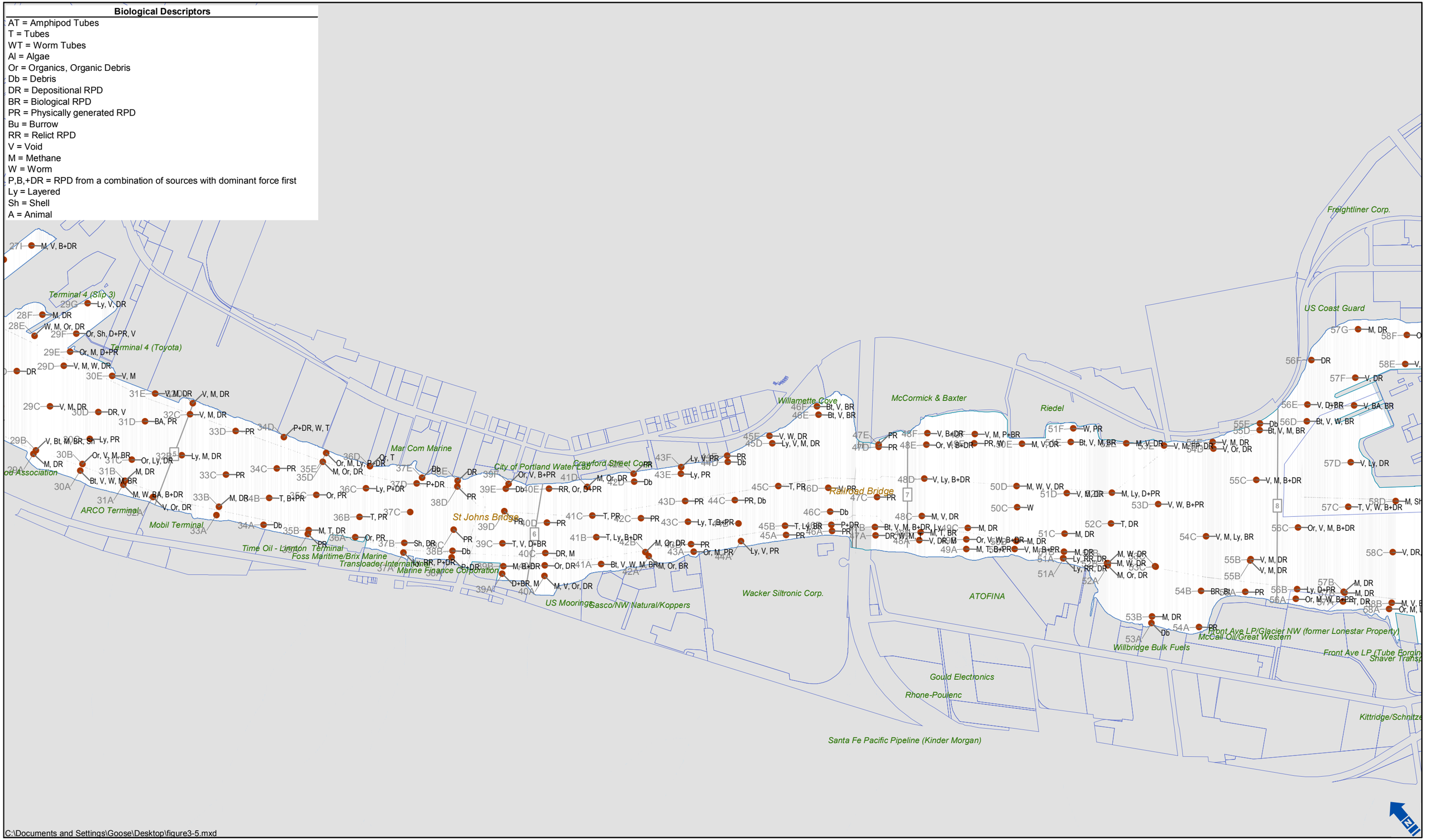
SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-6b
Sheet 2 of 4

Biological Descriptors

AT = Amphipod Tubes
T = Tubes
WT = Worm Tubes
Al = Algae
Or = Organics, Organic Debris
Db = Debris
DR = Depositional RPD
BR = Biological RPD
PR = Physically generated RPD
Bu = Burrow
RR = Relict RPD
V = Void
M = Methane
W = Worm
P,B,+DR = RPD from a combination of sources with dominant force first
Ly = Layered
Sh = Shell
A = Animal



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Legend

- Biological Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
Sediment Profile Imagery Point Data:
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SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-6c
Sheet 3 of 4

Biological Descriptors

AT = Amphipod Tubes
T = Tubes
WT = Worm Tubes
Al = Algae
Or = Organics, Organic Debris
Db = Debris
DR = Depositional RPD
BR = Biological RPD
PR = Physically generated RPD
Bu = Burrow
RR = Relict RPD
V = Void
M = Methane
W = Worm
P,B,+DR = RPD from a combination of sources with dominant force first
Ly = Layered
Sh = Shell
A = Animal

Terminal 4 (Slip 1)
Northwest Pipe & Casting
Schnitzer Investment Corp.
Romar Transportation
Jefferson Smurfit
Schnitzer Inv.Corp (Precision Edge Oil)
Time Oil - NW Terminal
Owens-Corning/Trumbal Asphalt
Babcock Land Co
RK Storage
GATX Linnton Terminal
ACF Industries
Georgia-Pacific Linnton
Linnton Fire Training
PGE-Harborton Substation
Alder Creek Lumber
Oregon Steel Mills
Terminal 5

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Legend

- Biological Features

FEATURE SOURCES:

Transportation, Water, Property, Zoning or Boundaries:
Metro RLIS.

SPI:
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SEDIMENT PROFILE SURVEY
Lower Willamette River

FIGURE 3-6d
Sheet 4 of 4

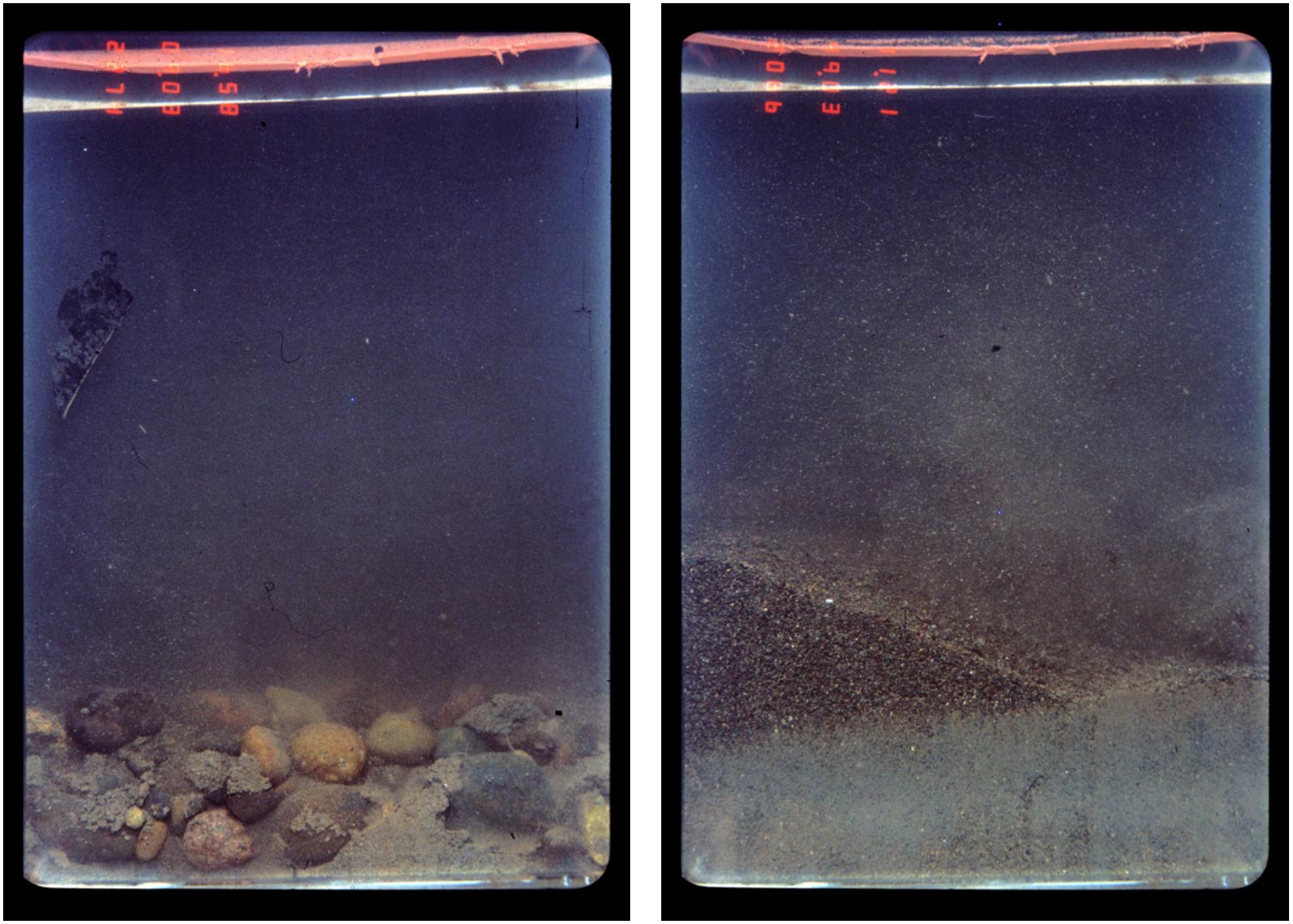


Figure 3-7. Representative SPI images from Stations 88B (left) and 80C (right), located in the main channel area of the upper surveyed area, illustrating the dynamic nature of the river from RM 15.7 to 11.

LEFT: Station 88B consists of washed, rounded gravel with medium sands present in the interstices of the gravel; the lag deposit at the surface is washed free of fine-grained sediments.

RIGHT: Station 80C is composed of transgressive, well-sorted fine to medium brown sand overlying and advancing over a poorly sorted gray, silty, fine sand.

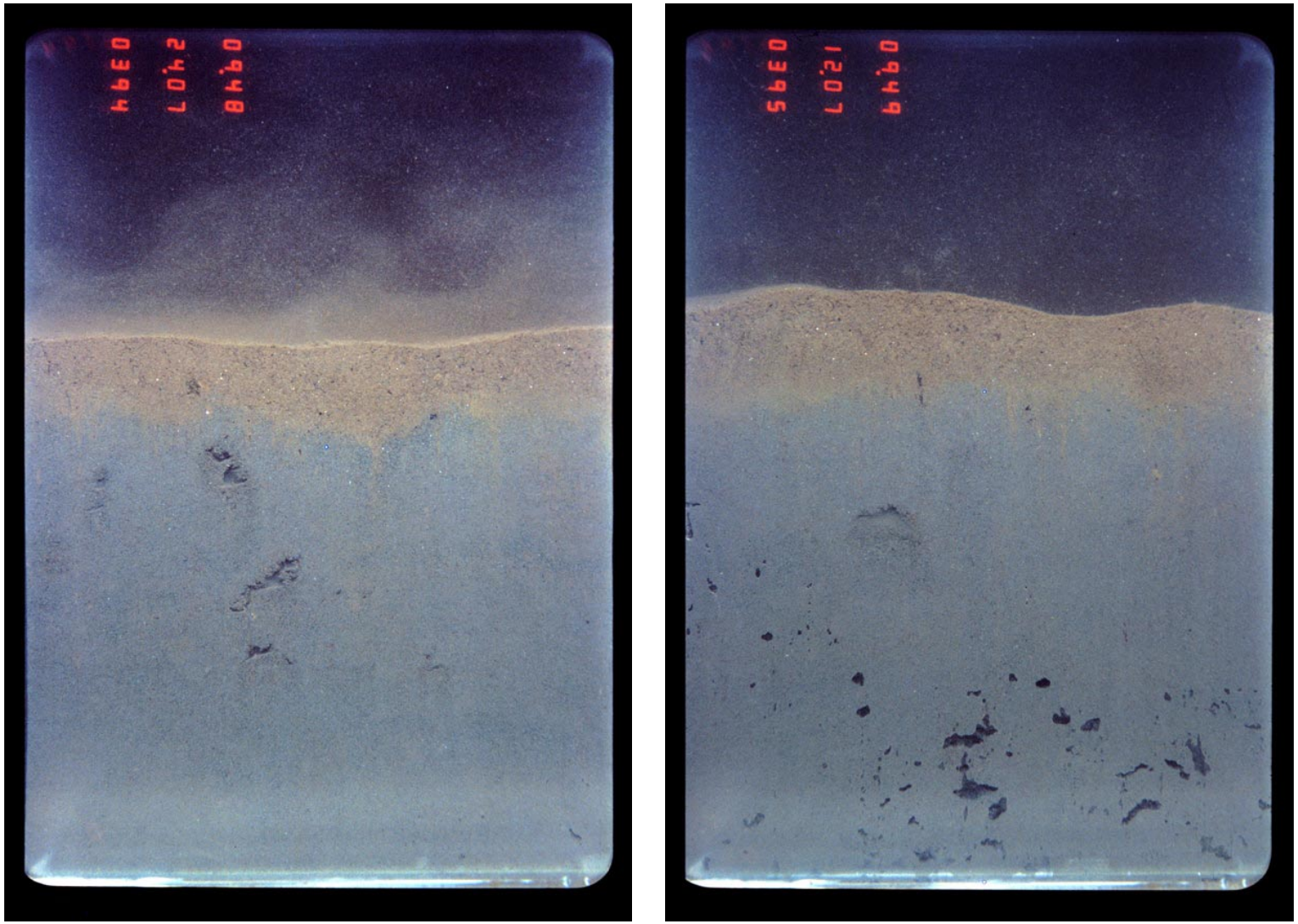


Figure 3-8. Representative SPI images from Station 90A, Replicate A (left) and replicate B (right), located in the nearshore area of the upper surveyed area. These images illustrate both the within station similarity and variability observed at depositional nearshore stations in the upper river.

LEFT: Note the gray, fine, sandy-silt with abundant small, dark organic particles interspersed in upper portion and prominent well-developed subsurface feeding voids from Stage 3 infauna.

RIGHT: This image also has gray, fine sandy silt with a prominent feeding void in left center of the frame. Fine worm tubes can be seen at the sediment-water interface, and numerous small methane pockets are present 4.8 cm below the sediment-water interface and extend to the bottom of the frame.

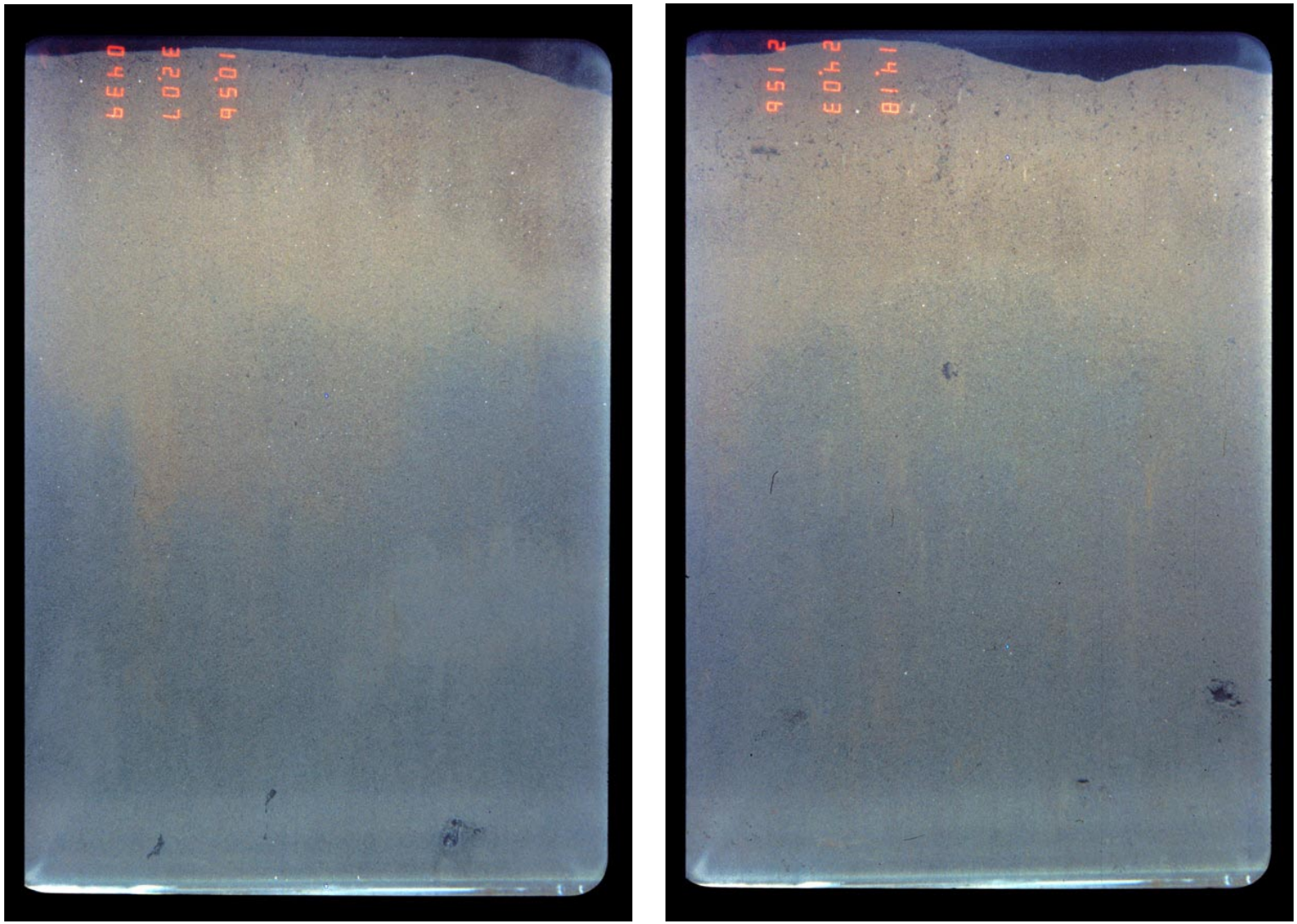


Figure 3-9. Representative SPI images from Stations 92A (left) and 83A (right), located in the nearshore area of the upper surveyed area. These stations show fine-grained sediments and biological features in nearshore sediments.

LEFT: Note the soft, gray, fine sandy silt with a deep RPD caused by the recent deposition of brown, oxidized fine-grained sediment. There is a methane-filled feeding void at the lower right of the frame and minor small subsurface methane pockets.

RIGHT: Station 83A is also composed of soft, tan and gray, slightly sandy silt with a well-defined, deep RPD that has been thickened by recent deposition of brown, fine-grained sediment. There are two distinct infaunal feeding voids in the lower right corner of the frame. This station is also highly depositional.

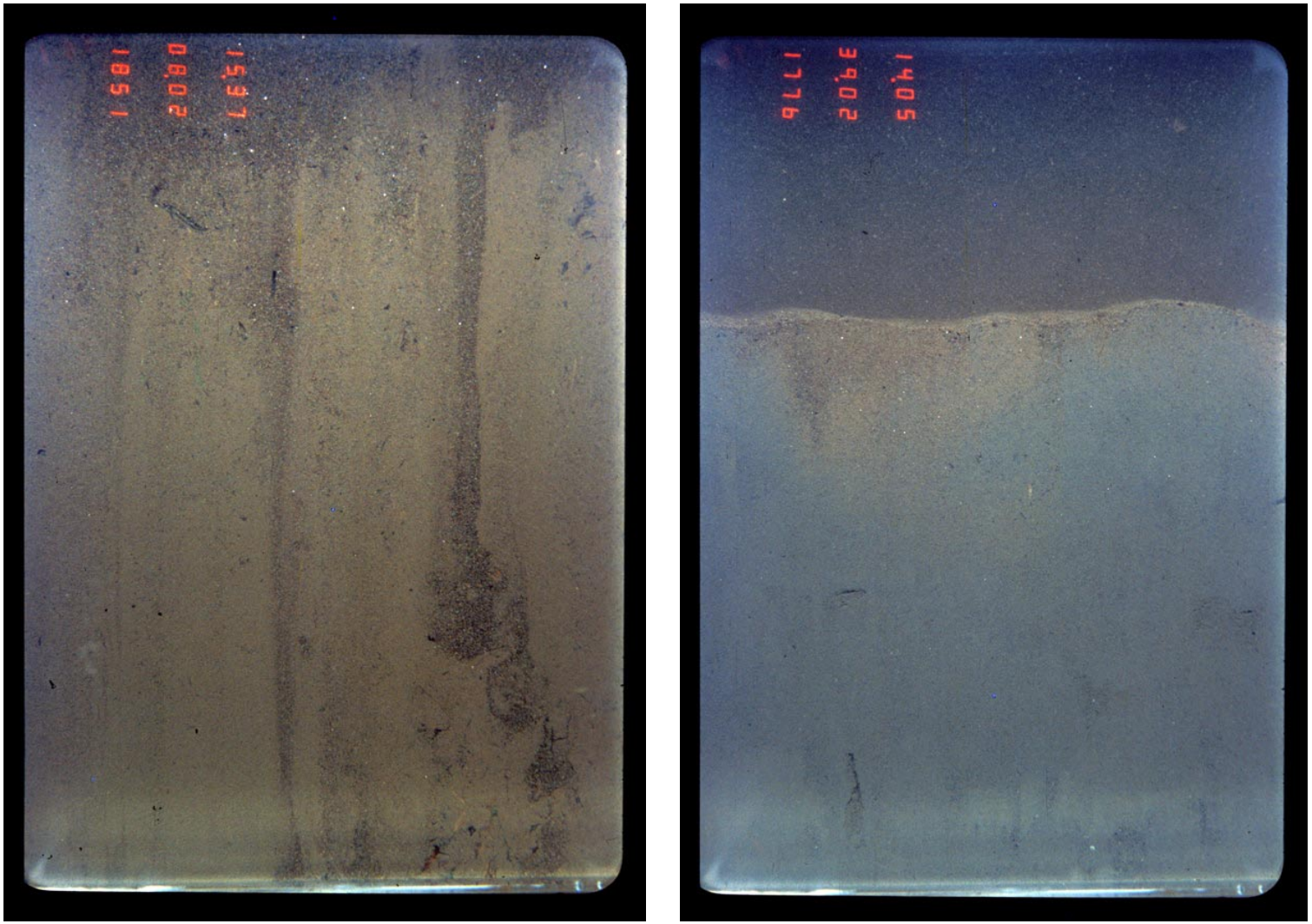


Figure 3-10. Representative SPI images from Stations 74B (left) and 71A (right), located in the main channel area of the 11.0 to 9.7 mile segment of the upper surveyed area and showing fine-grained sediments that have been deposited in the central channel of this river segment.

LEFT: Station 74B is composed of brown fine sand overlying light brown, organic, sandy silt with an infaunal organism in the lower right of the frame. Abundant organic particles, including a fir needle, are interspersed throughout sediment column; rapid deposition of oxidized, brown, fine-grained sediments has occurred at this station.

RIGHT: Station 71A is composed of gray, sandy silt with a thin RPD layer. There are active infaunal feeding voids at the right and left center of the frame from Stage 3 fauna. The RPD is thickest above left-center voids and physically controlled elsewhere. Although it appears to be depositional, this station does not experience the magnitude and rapidity of deposition observed at Station 74B.

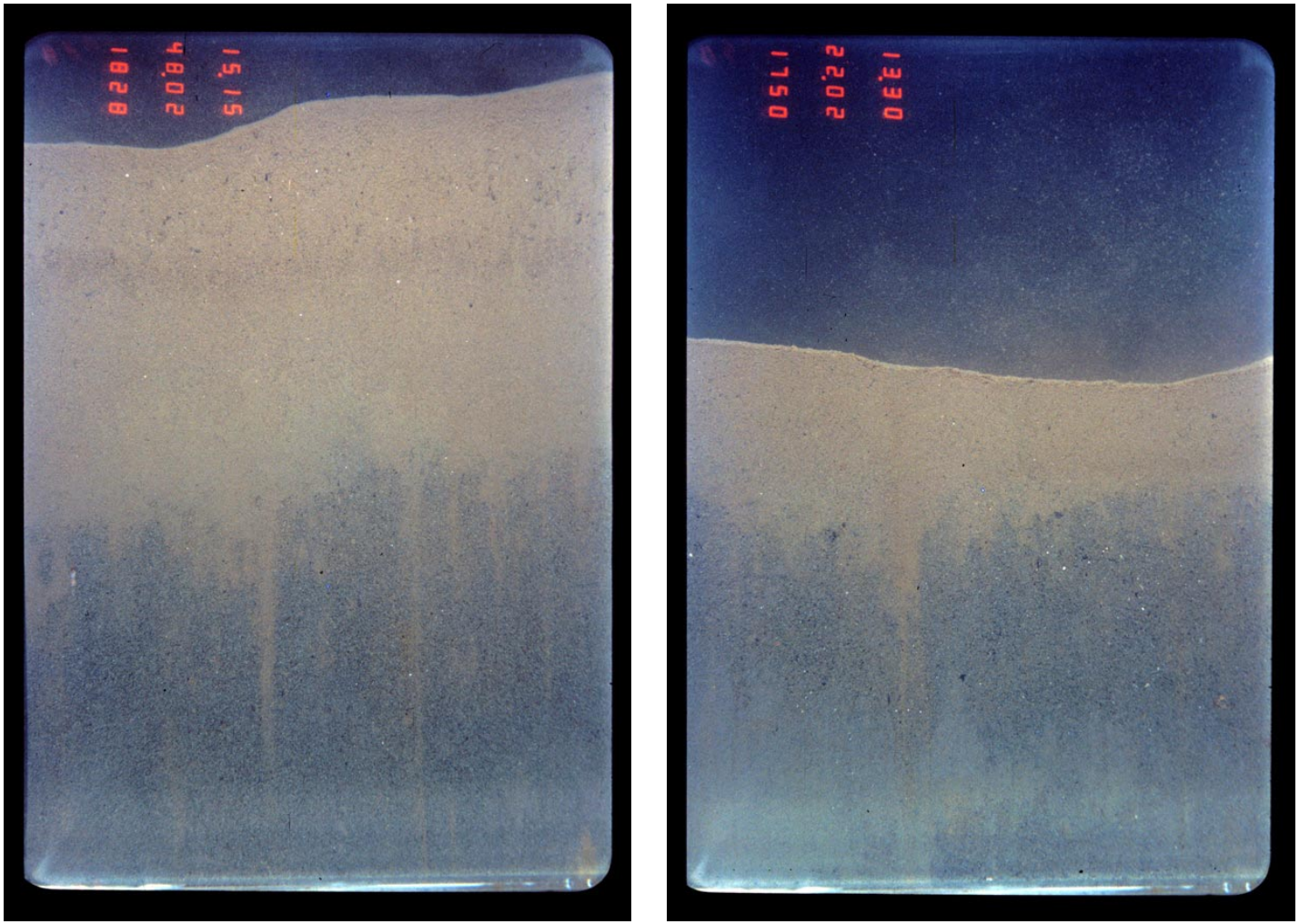


Figure 3-11. Representative SPI images from Stations 73D (left) and 70C (right), located in depositional nearshore areas of the 11.0 to 9.7 mile segment of the river.

LEFT: Station 73D is composed of very soft, poorly sorted, silty, fine sand with abundant organic particles in upper portion of the RPD. The RPD is very deep with a distinct band of fine sand 4.1 cm below the sediment-water interface. The top layer of the RPD appears to be recent deposition. The absence of methane and the layering within the RPD suggest that this station is both highly and rapidly depositional. There is a worm present at left of the frame, 10.5 to 11.1 cm below the sediment-water interface.

RIGHT: Station 70C is composed of poorly sorted fine sand overlying gray silt. The upper sand layer is 8.2 cm thick and the stratigraphic contact between the sand and underlying silt is well-defined. The RPD is deep and well defined. Worm tubes are present at the sediment-water interface in the left of frame. The upper sand layer is a distinct depositional unit from cyclical or periodic deposition.

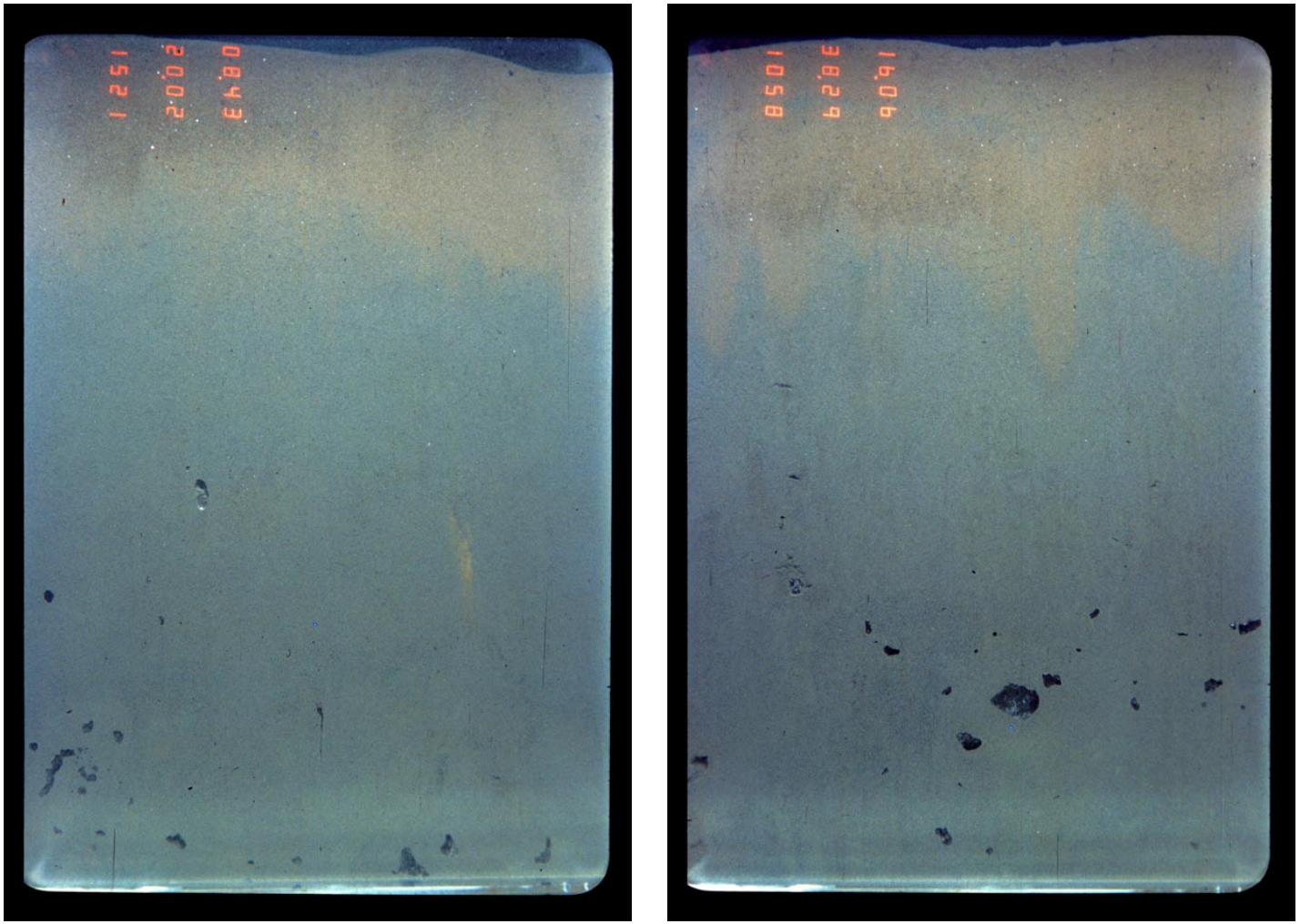


Figure 3-12. Representative SPI images from Stations 62C (left) and 48C (right), located in the main channel area of the upper Portland Harbor segment of the Willamette River. The images illustrate the soft, fine-grained, organic highly depositional characteristics of channel sediments in this reach.

LEFT: Station 62C is composed of very soft, homogeneous, gray slightly sandy silt with small methane pockets 10.8 cm below the sediment-water interface extending to the bottom of the frame. The RPD is depositional in origin and there is very subtle contrast between the tan, oxidized sediment and the underlying gray, reduced sediment. There is subsurface oxidized sediment from an old burrow at depth. This station appears to be highly and rapidly depositional.

RIGHT: Station 48C is composed of very soft, gray, fine sandy silt with abundant small methane pockets 14.4 cm below the sediment-water interface extending to bottom of frame. A series of feeding voids are present at the left of the frame. The RPD is primarily depositional in origin, and 1-2 cm thick depositional intervals can be seen within the RPD. This station is also highly depositional. These stations are very similar and the RPDs show the highly depositional nature of the sediments in this river segment and the widespread presence of sedimentary methane suggests the high organic content in the depositional sediments.

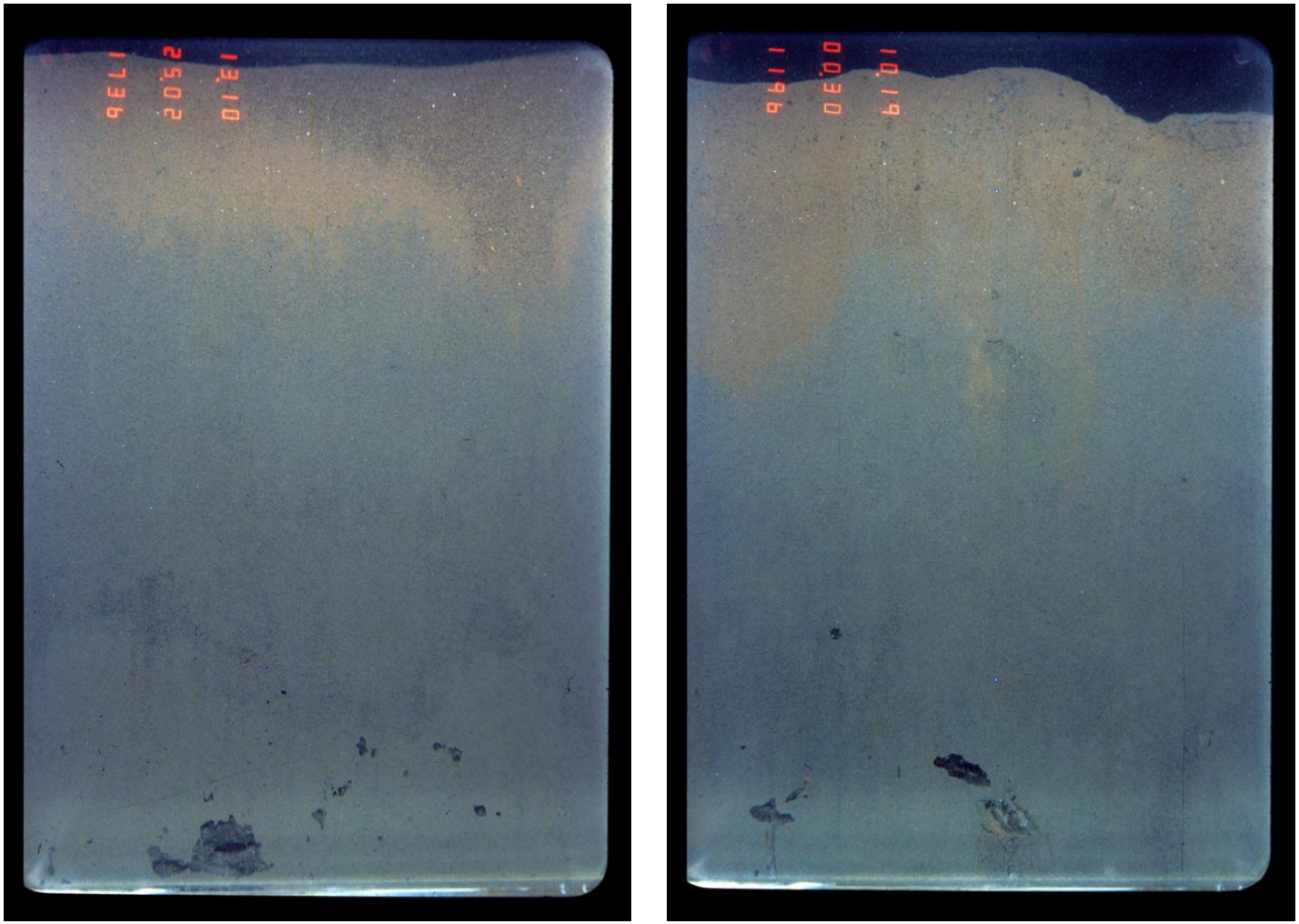


Figure 3-13. Representative SPI images from Stations 69D (left) and 51D (right), located in the deep dredged (borrow) areas of the upper Portland Harbor segment of the Willamette River. Sediments within the dredged areas are similar to those found in the main body of the river channel.

LEFT: Station 69D is composed of a fine sand veneer over slightly sandy, gray, silt. The surface layer of brown, well-sorted fine sand varies from 0.3 to 2.5 cm in thickness. There is a band of dark fine sand 14.4 cm below the sediment-water interface (SWI) and this may denote the basal member of the depositional unit. There are subsurface methane pockets 16.8 cm below the SWI extending to the bottom of the frame. Small tubes are present at the SWI. This station is highly depositional.

RIGHT: Station 51D is composed of soft, gray, slightly sandy silt. There is an infaunal feeding void in the center of the frame and a few moderately sized methane pockets 13.5 to 19.1 cm below the SWI. The RPD contrast is subtle and the RPD is primarily depositional in origin although there is a biogenic mound at the SWI in the center of the frame. This station is also highly depositional.

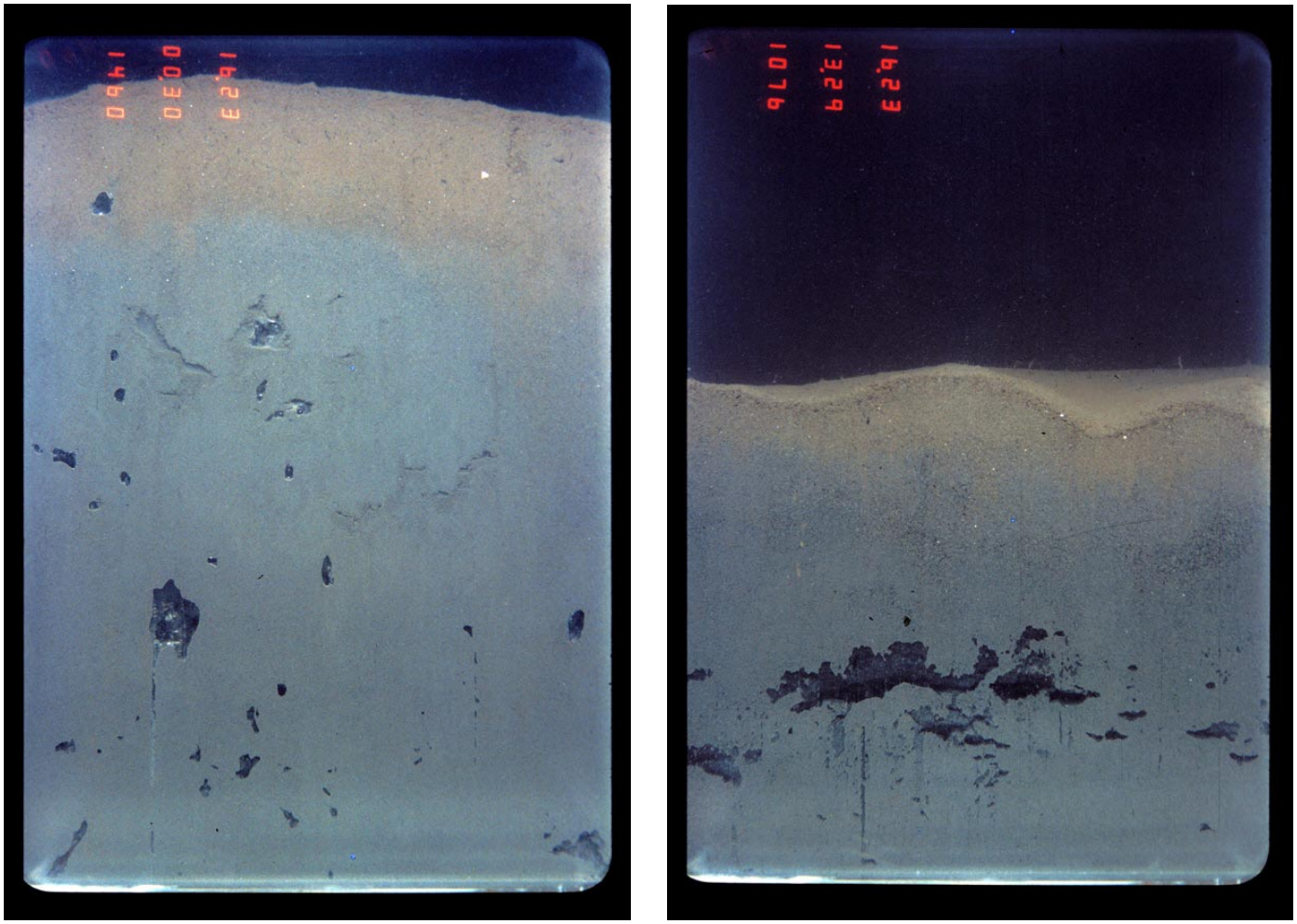


Figure 3-14. Representative SPI images from Stations 60A (left) and 49A (right), located in depositional nearshore areas of the upper Portland Harbor segment of the Willamette River.

LEFT: Station 60A is composed of very soft, gray, slightly sandy silt with abundant small and large subsurface methane pockets. Upwards ebullition of methane vesicles is apparent and many are trapped in feeding voids. The RPD is thickened by the deposition of oxidized fine-grained sediment. A band of fine sand is present within the RPD and denotes the basal layer of a recently deposited sediment. There is a large network of infaunal feeding voids present in the subsurface sediment and minor small worm tubes at the SWI. This station is highly depositional.

RIGHT: Station 49A is composed of sandy, gray silt with large methane pockets in a linear band 6.8 to 9.3 cm below the SWI. There are small ripples at the SWI with worm tubes in the background. The RPD is formed by a mix of physical and biological processes. These nearshore stations are very organic as evidence by the number and size of methane vesicles in the subsurface sediment.

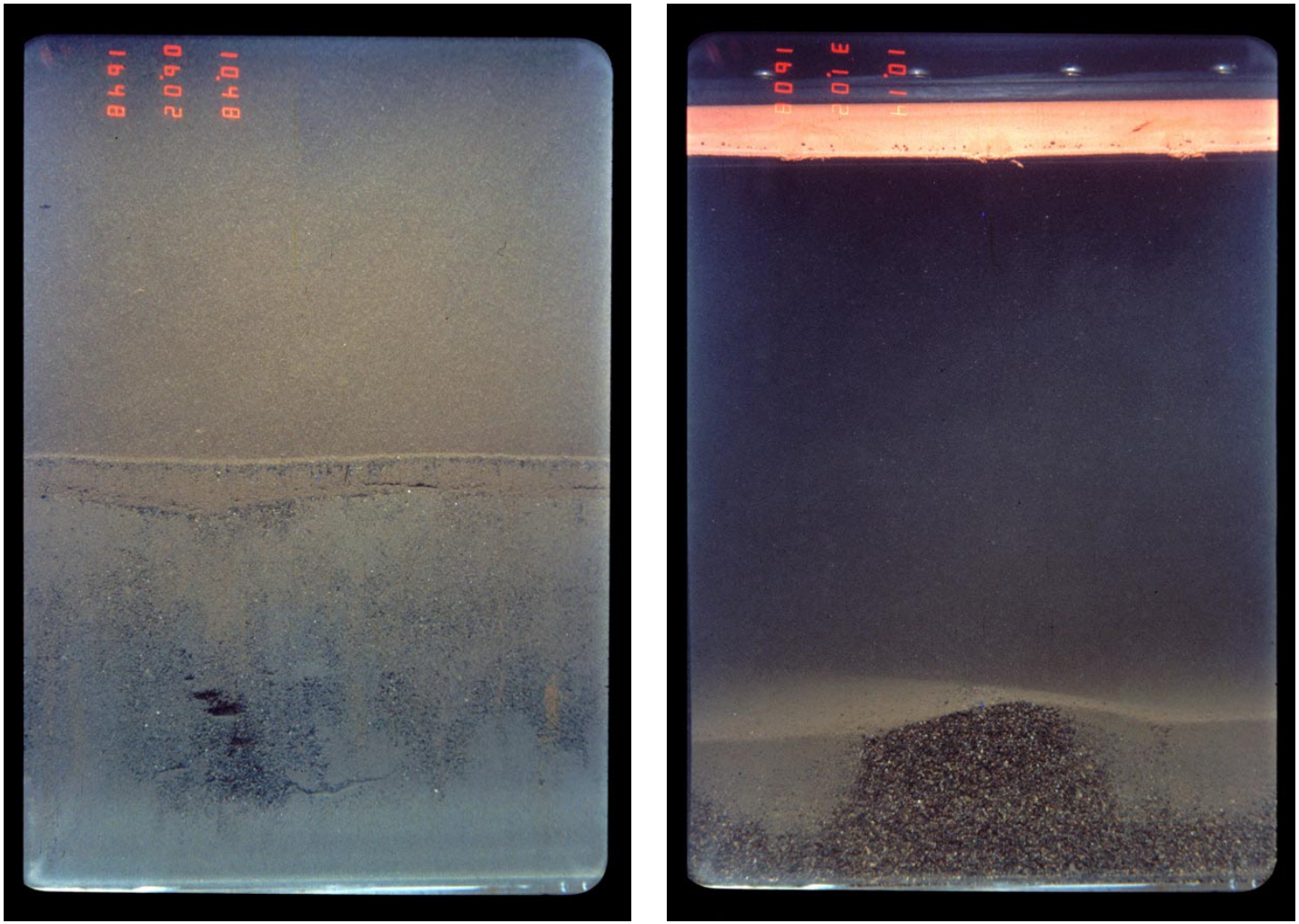


Figure 3-15. Representative SPI images from Stations 67A (left) and 66F (right), located in kinetically-active nearshore areas of the upper Portland Harbor segment of the Willamette River.

LEFT: Station 67A is composed of poorly sorted, dark, fine sand overlying gray silt. There is a prominent void complex in middle left of the frame from Stage 3 infaunal feeding activity. An exceptionally well-preserved, 1.1 cm thick, laminar bed is easily discernible at the SWI. Based on the increased sorting at the upper contacts of the two discernible sand layers the station is subject to periodic sediment transport and deposition.

RIGHT: Station 66F is composed of a veneer of tan silt overlying well-sorted medium sand. The sand is light colored and appears to be native sediment. The RPD is defined by the mantle of silt overlying the sorted sand, and the RPD is deepest in the troughs surrounding the ripple crest in center of frame. This shallow, nearshore station is subject to alternating periods of sediment transport, when the fines are winnowed from the sands and periods of quiescence that allow the deposition of the silt veneer. This is likely related to rising and falling river stages.

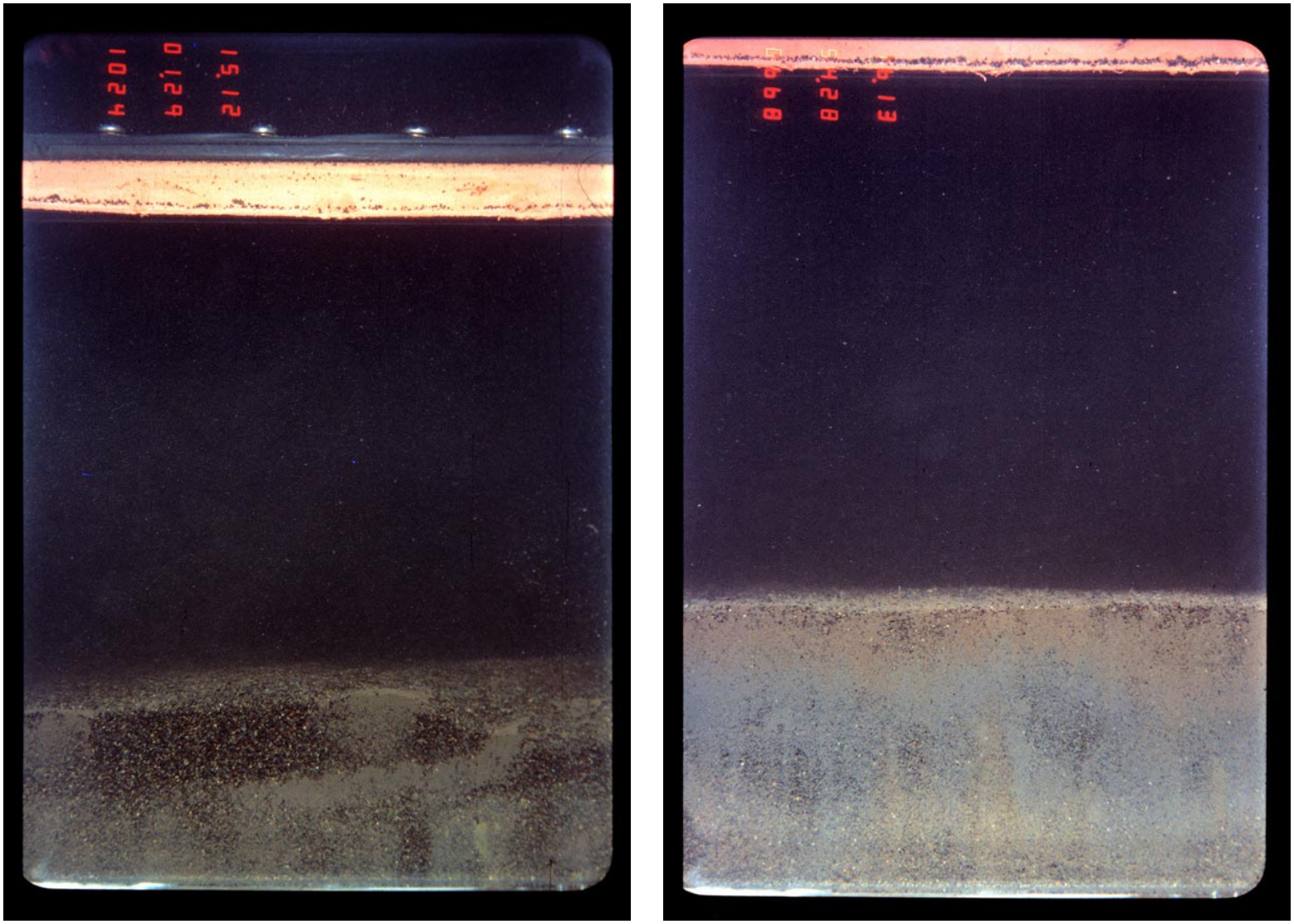


Figure 3-16. Representative SPI images from Stations 47C (left) and 36B (right), located in kinetically-active main channel areas of the middle Portland Harbor segment of the Willamette River. Images from these stations illustrate the dynamic nature of this river segment.

LEFT: Station 47C is composed of well to poorly sorted, fine to medium, brown sand. Flaser bedding, with tan silt lenses within the sand matrix, indicate active sediment transport. The sediment-water interface is also washed free of fine-grained sediment.

RIGHT: Station 36B is composed of poor to moderately sorted, fine to medium sand with small worm tubes present at the SWI. The SWI at this station is also winnowed free of fines and appears to be undergoing sediment transport.

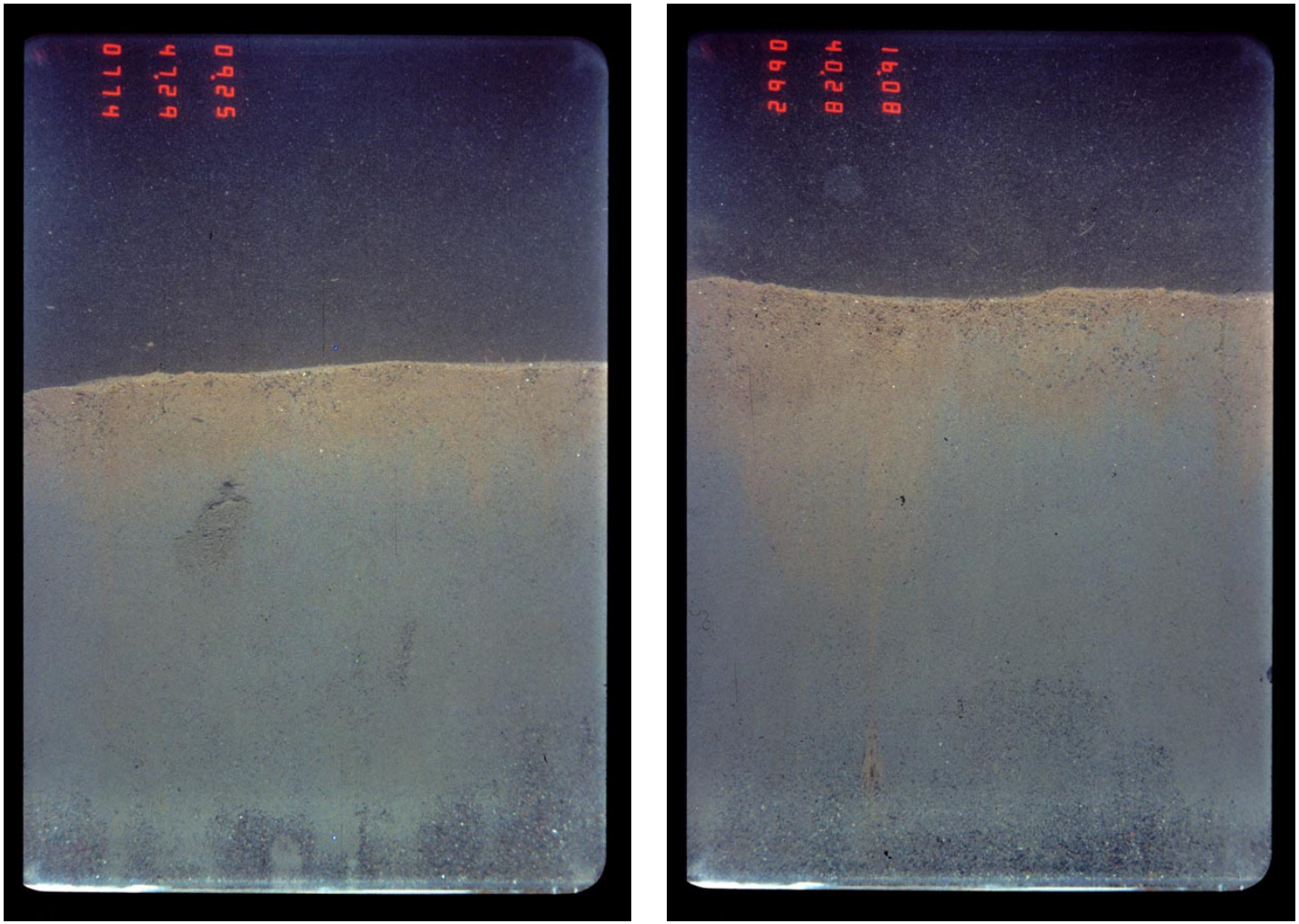


Figure 3-17. Representative SPI images from Stations 39C (left) and 36C (right), located in depositional main channel areas of the middle Portland Harbor segment of the Willamette River.

LEFT: Station 39C is composed of gray, sandy silt overlying well-sorted, fine to medium, dark gray sand. An infaunal feeding void is apparent in the upper mid-left of the frame and worm tubes are present at the SWI. The upper silt layer is 11.1 cm thick and is a discrete depositional unit. The basal sand layer suggests that this station has periodic high current flows and can be subject to periodic intervals of sediment transport and deposition.

RIGHT: Station 36C is composed of gray, slightly sandy silt overlying well-sorted fine to medium dark sands. This station shows features similar to those observed at Station 39C. The sand layer is 12.9 cm below SWI and denotes a depositional contact with the silt layer being recently deposited sediment. A buried RPD can be seen immediately below the sediment-water interface further emphasizing the episodic deposition at this station.

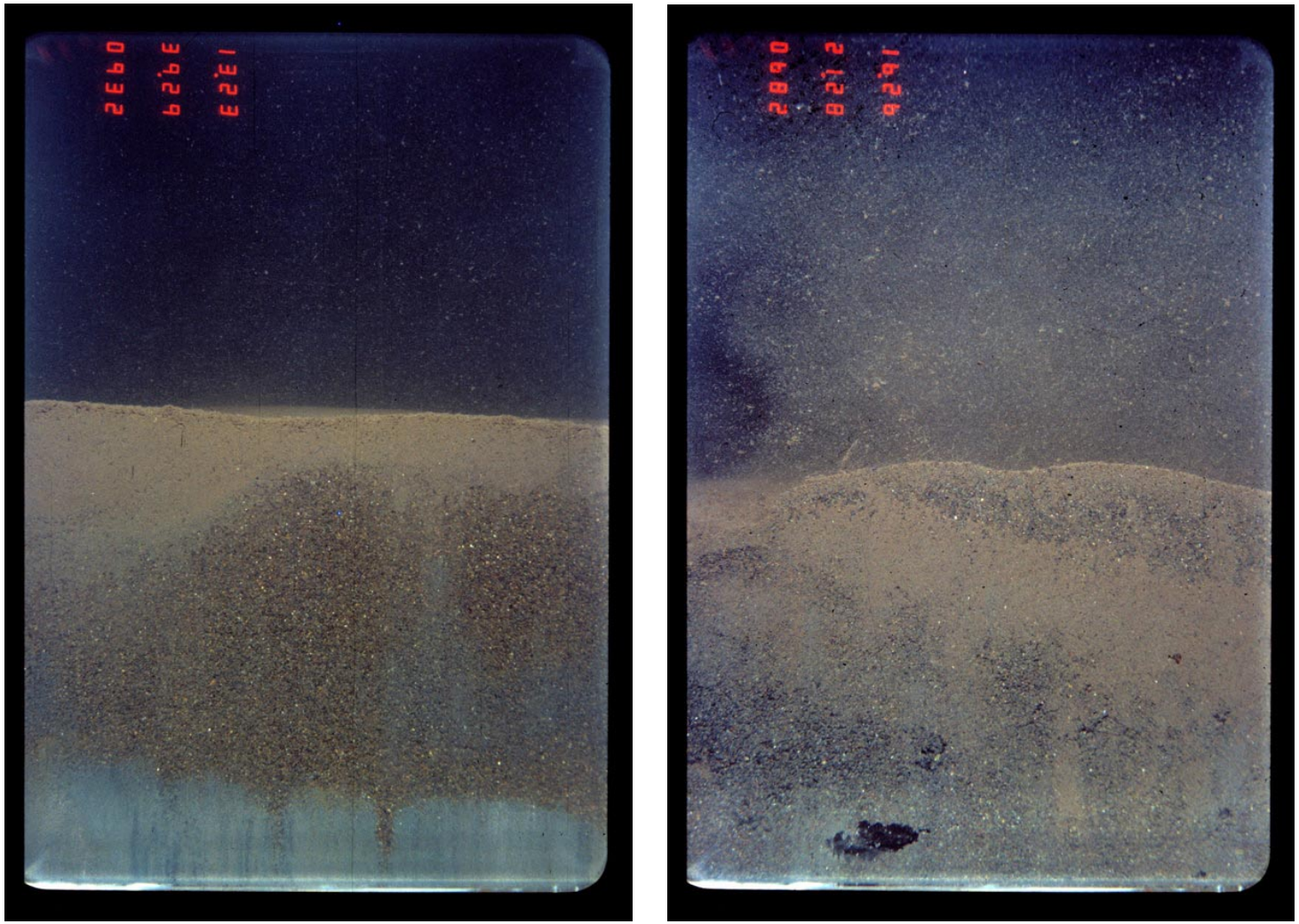


Figure 3-18. Representative SPI images from Stations 44A (left) and 37A (right), located in kinetically active nearshore areas of the middle Portland Harbor segment of the Willamette River.

LEFT: Station 44A is composed of a thick layer of sorted, tan fine sand overlying gray clay/silt. The sand layer is 9 cm thick and a distinct mantle of tan silt at the SWI defines the RPD. The contact between the overlying sand and the underlying silt is distinct and suggests that the station was disturbed prior to the deposition of the sand.

RIGHT: Station 37A is composed of tan to gray, silty fine sand with distinct depositional layers from sediment transport and accretion. A buried RPD is easily discernible at right. This buried RPD indicates a previous SWI that has been buried by deposition via bedload transport. A large methane bubble is present in a infaunal feeding void 8.6 cm below SWI.

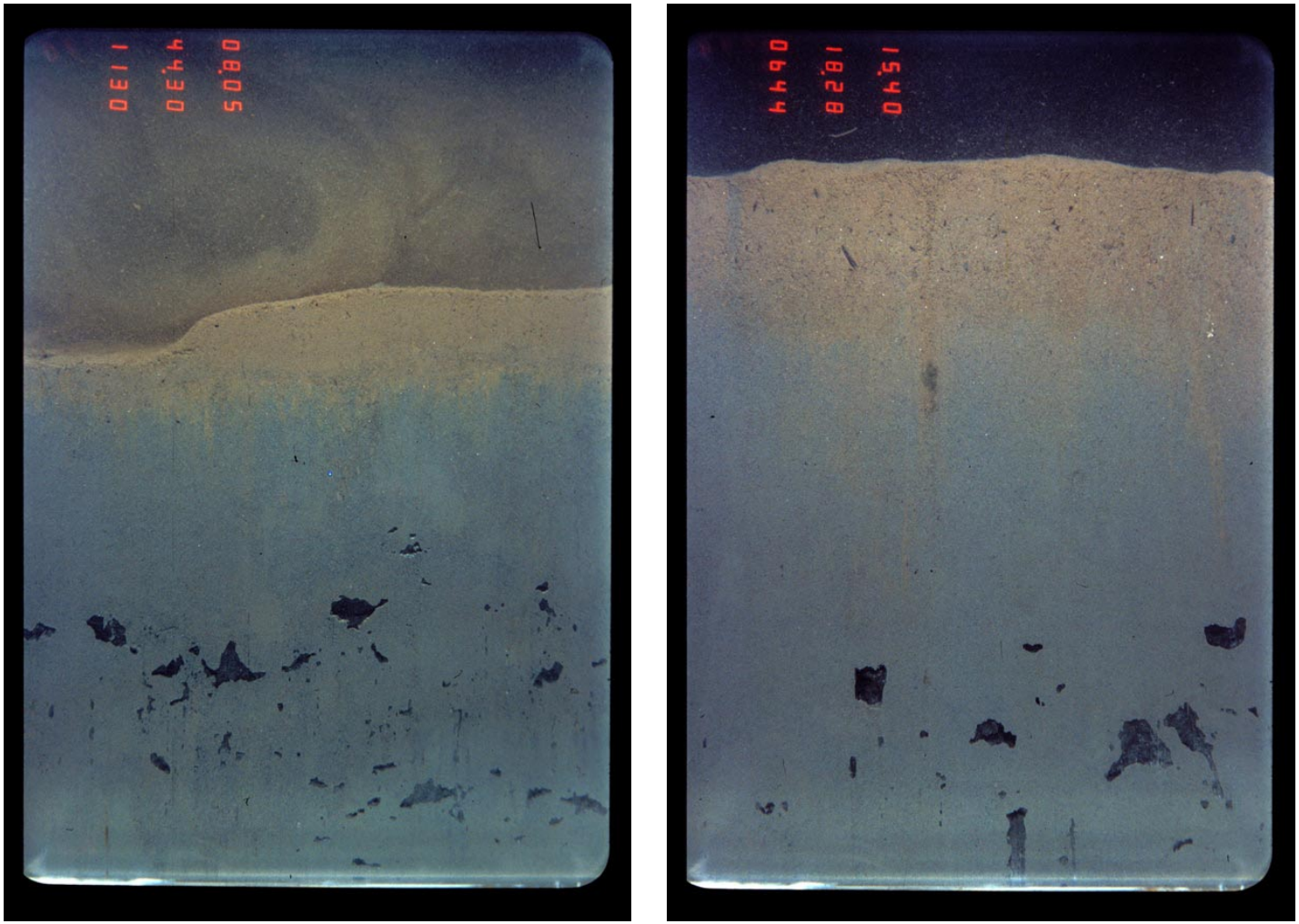


Figure 3-19. Representative SPI images from Stations 42A (left) and 35D (right), located in depositional nearshore areas of the middle Portland Harbor segment of the Willamette River.

LEFT: Station 42A is composed of gray, organic silt with abundant large and small methane pockets 6.3 to 14.5 cm below SWI. This station is highly methanogenic with an organic band 9 cm below the SWI. The RPD is well-defined and appears dominantly biological. Based on the fine grain-size, the presence of sedimentary methane, and the high organic content, this station is depositional.

RIGHT: Station 35D is composed of soft, gray, organic, slightly sandy silt with abundant large and small methane vesicles 1-18 cm below SWI. Abundant organic detrital particles are interspersed in upper portion of the sediment column. The RPD is influenced by deposition and burial of oxidized particles. This station is highly depositional and generally similar in appearance to 42A.

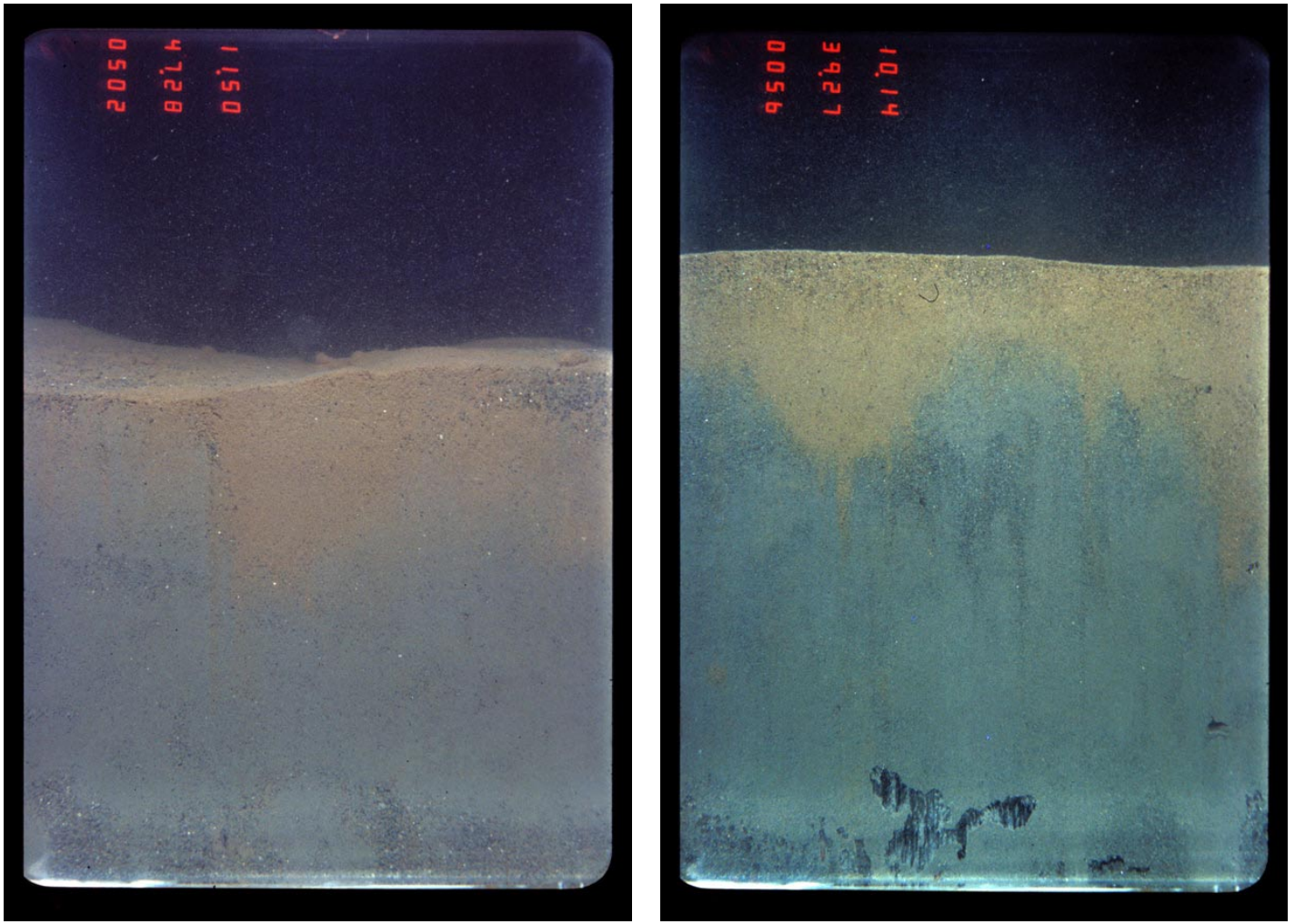


Figure 3-20. . Representative SPI images from Stations 30C(left) and 18D(right), located in depositional main channel areas of the lower Portland Harbor segment of the Willamette River.

LEFT: Station 30C is composed of light gray, silty fine sand with distinct layering. Each layer consists of a normally graded stratigraphic sequence with the coarsest particles at the bottom of the layer becoming fine-grained upwards. The SWI shows evidence of sediment resuspension as some of the tan, fine silts have been washed away leaving an exposed residue of sand. Based on the layering and presence of sands, this station appears to undergo alternating periods of sediment transport and deposition, but the station appears to be net depositional.

RIGHT: Station 18D is composed of gray, fine sandy silt with an infaunal feeding void in lower right of the frame. This station also exhibits layering with normally graded depositional sequences. There is a large methane pocket in the lower part of the frame. This station, based on the normally graded sequences, appears to undergo periods of sediment transport and episodic deposition with net accumulation.

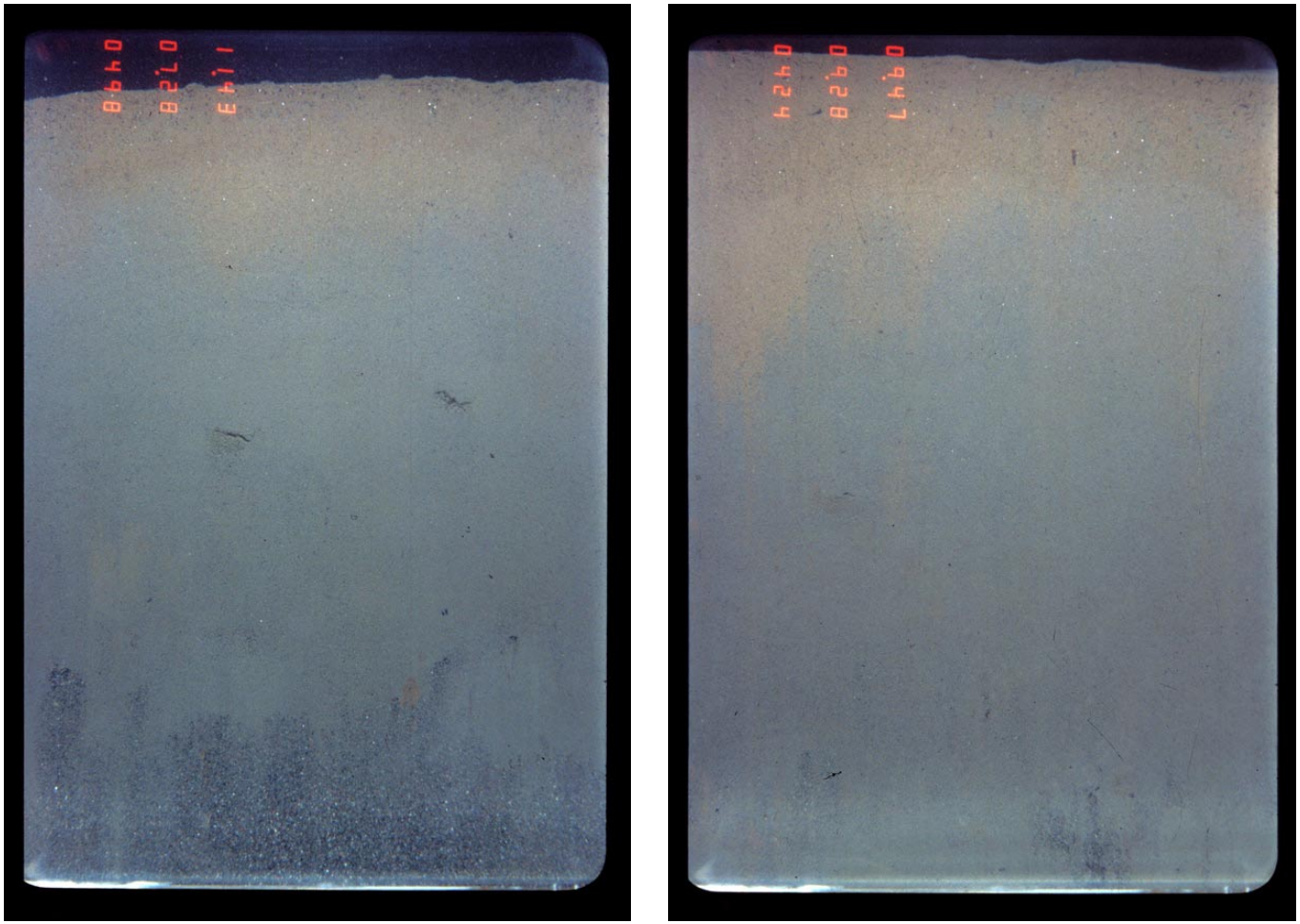


Figure 3-21. Representative SPI images from Stations 30D(left) and 28D(right), located in dredged areas of the lower Portland Harbor segment of the Willamette River.

LEFT: Station 30D is composed of light gray, homogeneous, sandy silt overlying well-sorted, dark gray, medium to fine sand. The 15.6 cm thick silt layer has two prominent infaunal feeding voids. The tan RPD exhibits low contrast and is formed from a combination of bioturbation and deposition. The absence of methane in the upper silt layer suggests that the sediment was deposited rapidly and there has been insufficient time since deposition for methanogenesis to occur. This station is highly depositional.

RIGHT: Station 28D is composed of soft, gray silt with a minor sand fraction in upper 4 cm of sediment column. The gray upper silt layer overlies a band of gray fine sand visible at the bottom of the frame. The RPD is faint, light tan and the contrast between the RPD and underlying gray reduced sediment is subtle. The homogeneous sedimentary fabric and lack of methane suggests that the silt layer was recently and rapidly deposited, similar to Station 30D. As these stations are located in dredged areas that are topographic lows, higher rates of deposition than elsewhere in the river are likely.

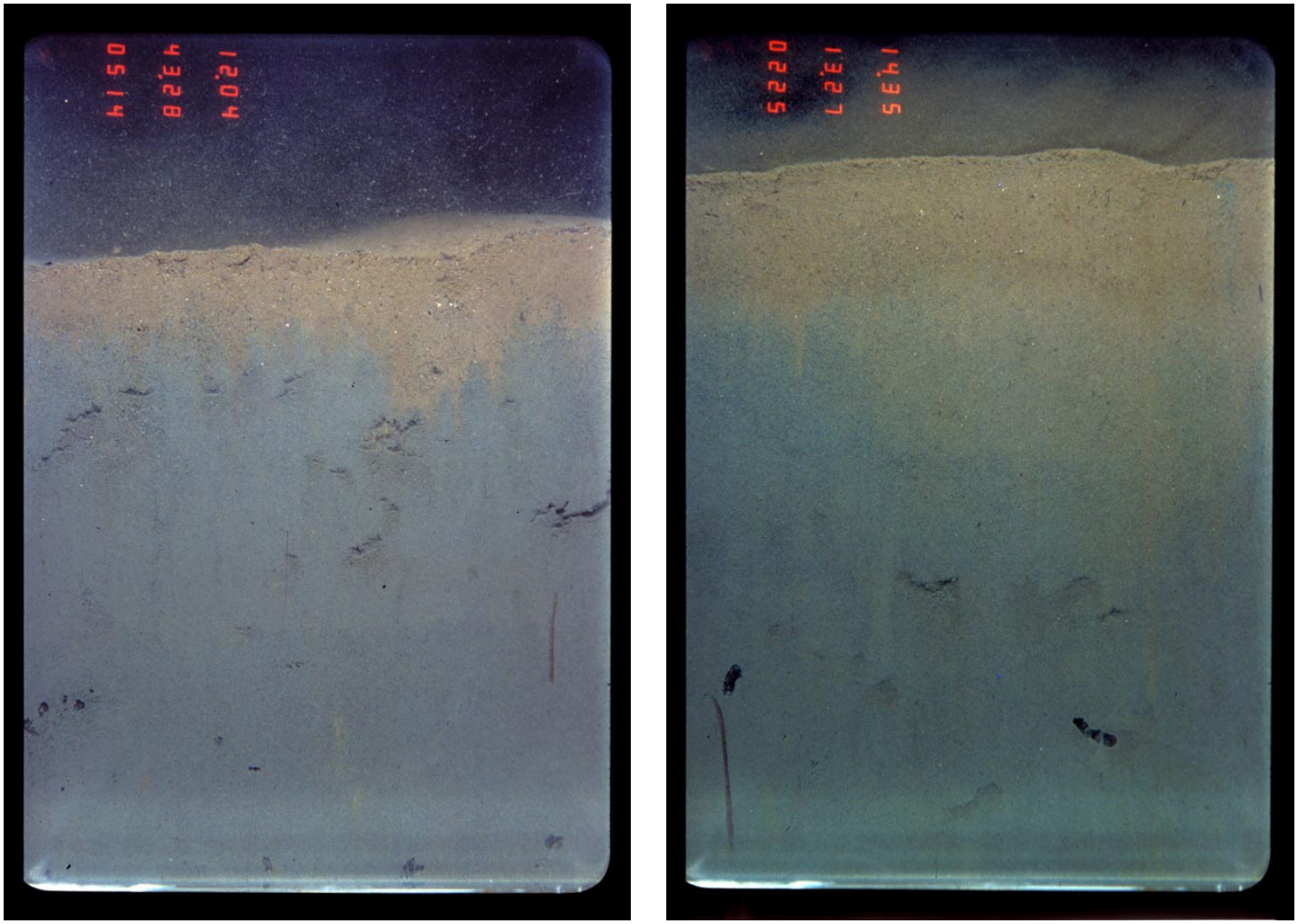


Figure 3-22. Representative SPI images from Stations 30A(left) and 23B(right), located in depositional nearshore areas of the lower Portland Harbor segment of the Willamette River.

LEFT: Station 30A is composed of intensely bioturbated, gray, slightly sandy silt. The subsurface sediments are riddled with abundant feeding voids from Stage 3 infauna. A large red worm (Oligochaeta) is visible in the right side of the image. There are minor, small methane pockets at the lower left of the frame. There is a strong contrast between the bright tan RPD and underlying gray sediments and the RPD at this station is formed by biological processes (bioturbation).

RIGHT: Station 23B is composed of soft, gray, slightly fine sandy silt with well-formed feeding voids from Stage 3 infauna at depth within the sediment column. The RPD has a thin band of fine sand within the tan silts and appears to be formed by both biological and depositional processes. At both of these stations, the subsurface sediment is being extensively reworked by the resident infauna.

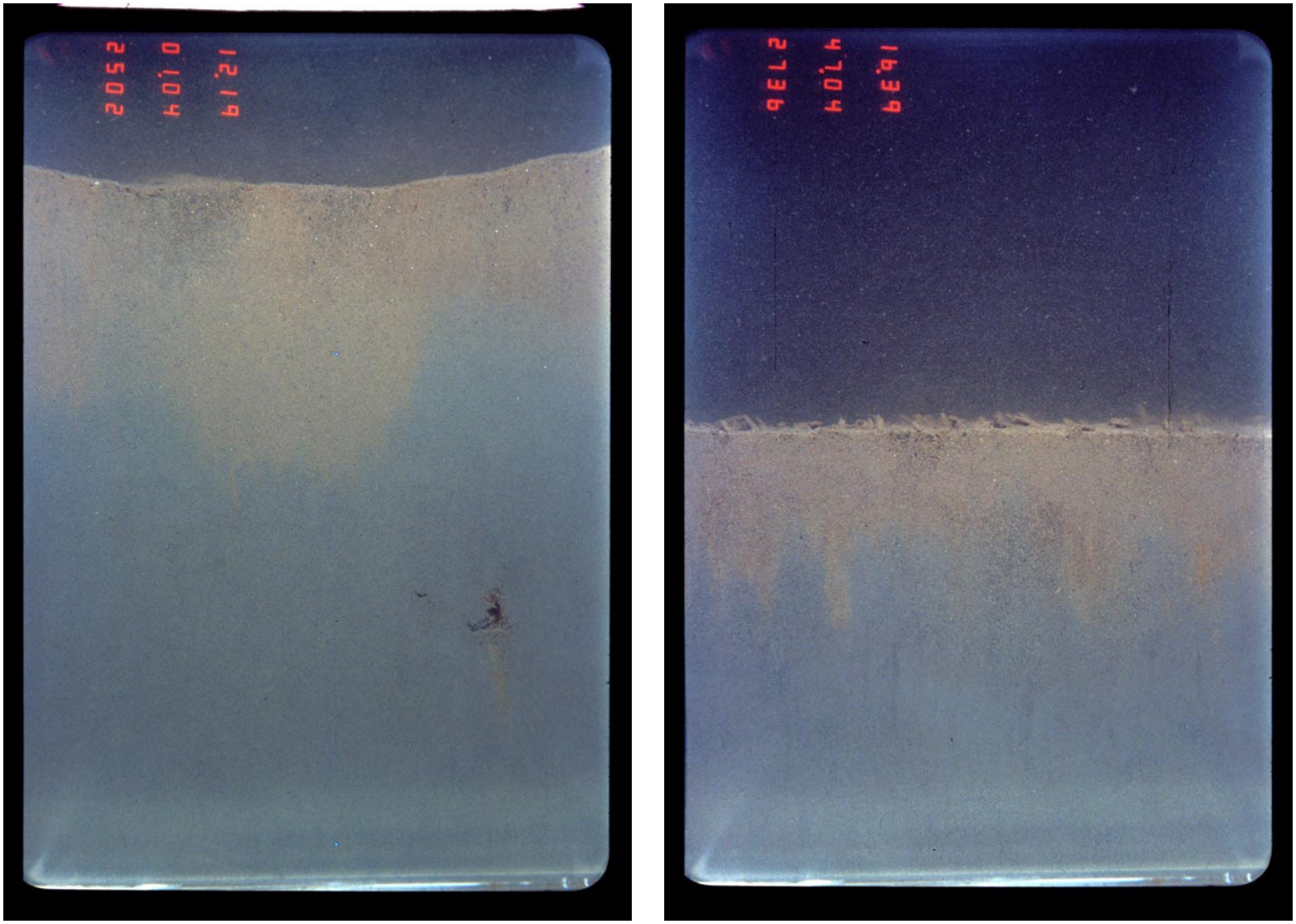


Figure 3-23. Representative SPI images from Stations 13C (left) and 8D (right), located in depositional main channel areas of the 3.0 to 1.1 mile segment of the lower Willamette River.

LEFT: Station 13C is composed of soft, gray, fine sandy silt with a prominent Stage 3 infaunal feeding void in right center of frame. Small worm tubes are present at the SWI. The sediment is slightly sandier at the SWI and the RPD is low-contrast and thickened by deposition. This station is depositional.

RIGHT: Station 8D is composed of gray, fine sandy silt with abundant amphipod tubes at the SWI. Fine-grained sediments are being sequestered by the tubes. The RPD has a high contrast with the underlying reduced sediments and is a result biological activity. The station appears to be depositional.

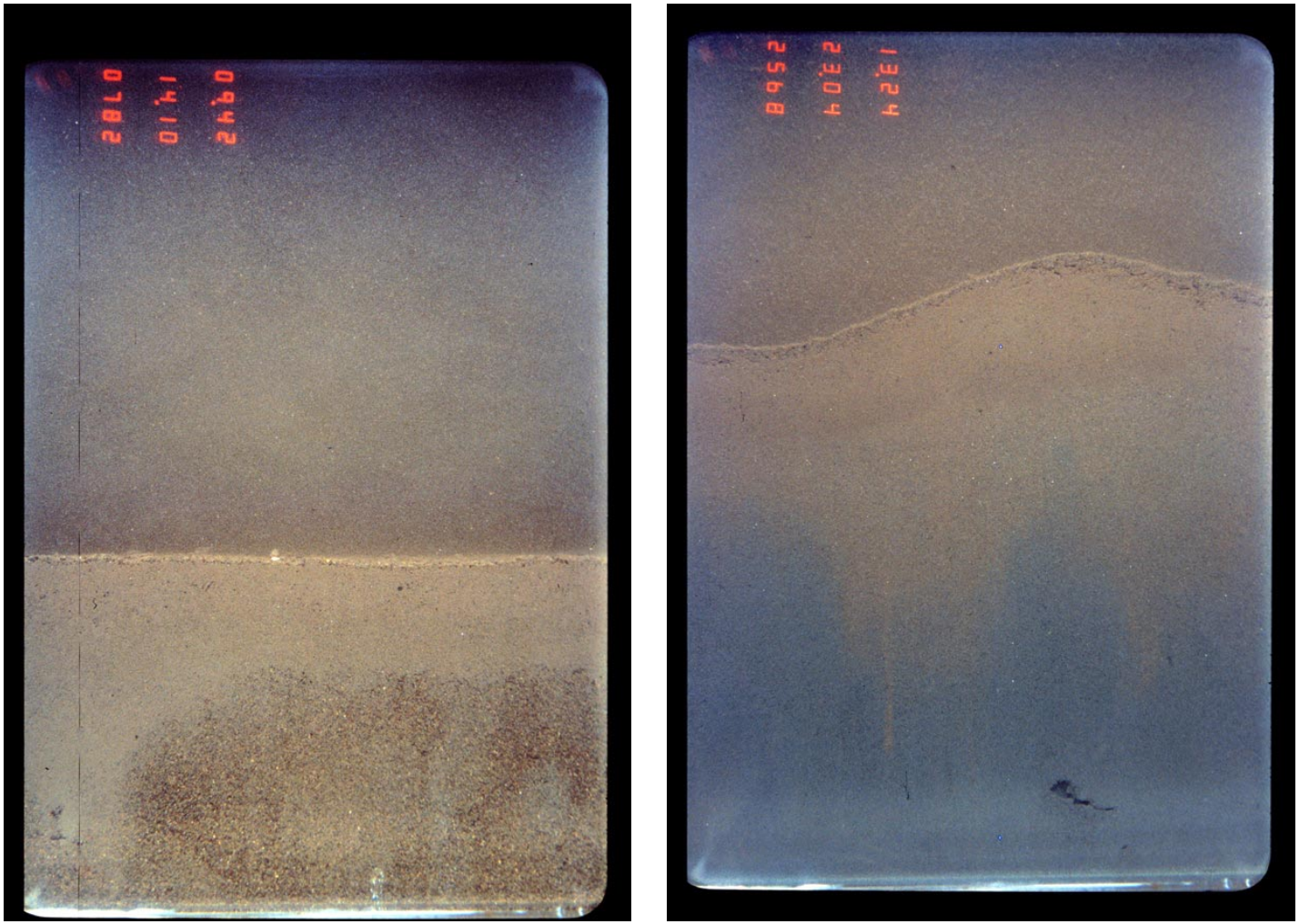


Figure 3-24. Representative SPI images from Stations 16A (left) and 11A (right), located in the nearshore areas of the 3.0 to 1.1 mile segment of the Lower Willamette River.

Left: Station 16A is composed of tan silt overlying brown, sorted, fine sand. This station is located in the shallow bank area where the Multnomah Channel empties into the Willamette River. The basal sands were sorted through current and wave action, in a subsequent period of quiescence the tan silt mantle was deposited. This station illustrates the episodically dynamic and depositional nature of sediments in the nearshore environment.

Right: Station 11A is composed of gray, sandy silt with a prominent feeding void in the lower center of the frame. Above the feeding void, a biogenic mound is present. There is a layer of brown fine sand within the RPD indicating that RPD is both depositional and biological in origin. A thin, 0.4 cm layer, of biogenically aggregated fecal material is present at the sediment-water interface. This station is exemplary of a depositional nearshore environment.

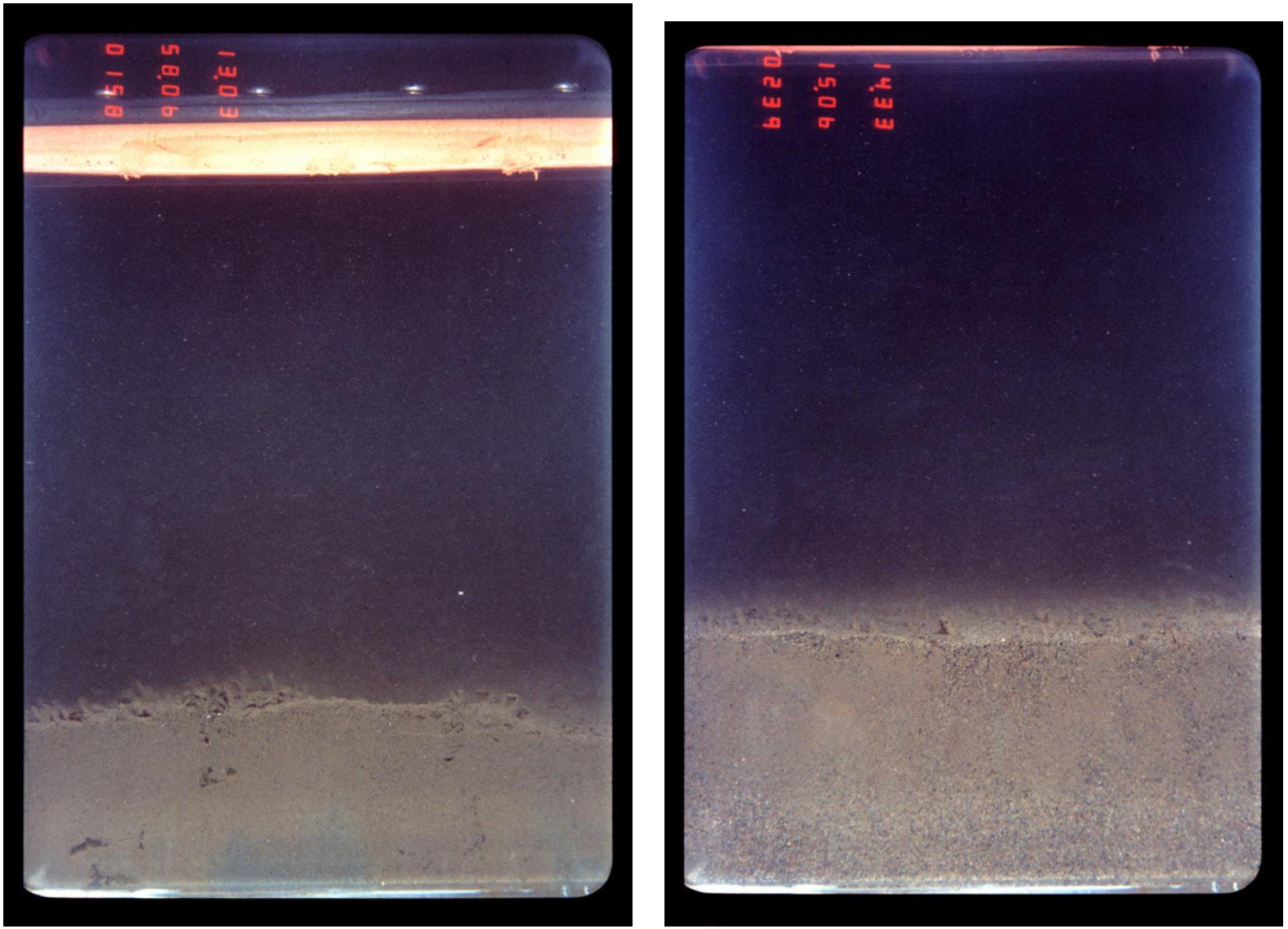


Figure 3-25. Representative SPI images from Stations 3D (left) and 1D (right), located in the main channel areas of the 1.1 to 0 mile segment of the lower Willamette River.
Left: Station 3D is a firm, tan, fine sandy silt with dense amphipod tubes at SWI, and numerous voids in sediment column. The tube mat appears to be sequestering fine-grained sediments.
Right: Station 1D is a moderately sorted light-hued silty fine sand with amphipod and worm tubes at SWI. This station appears to be an area of sediment transport.

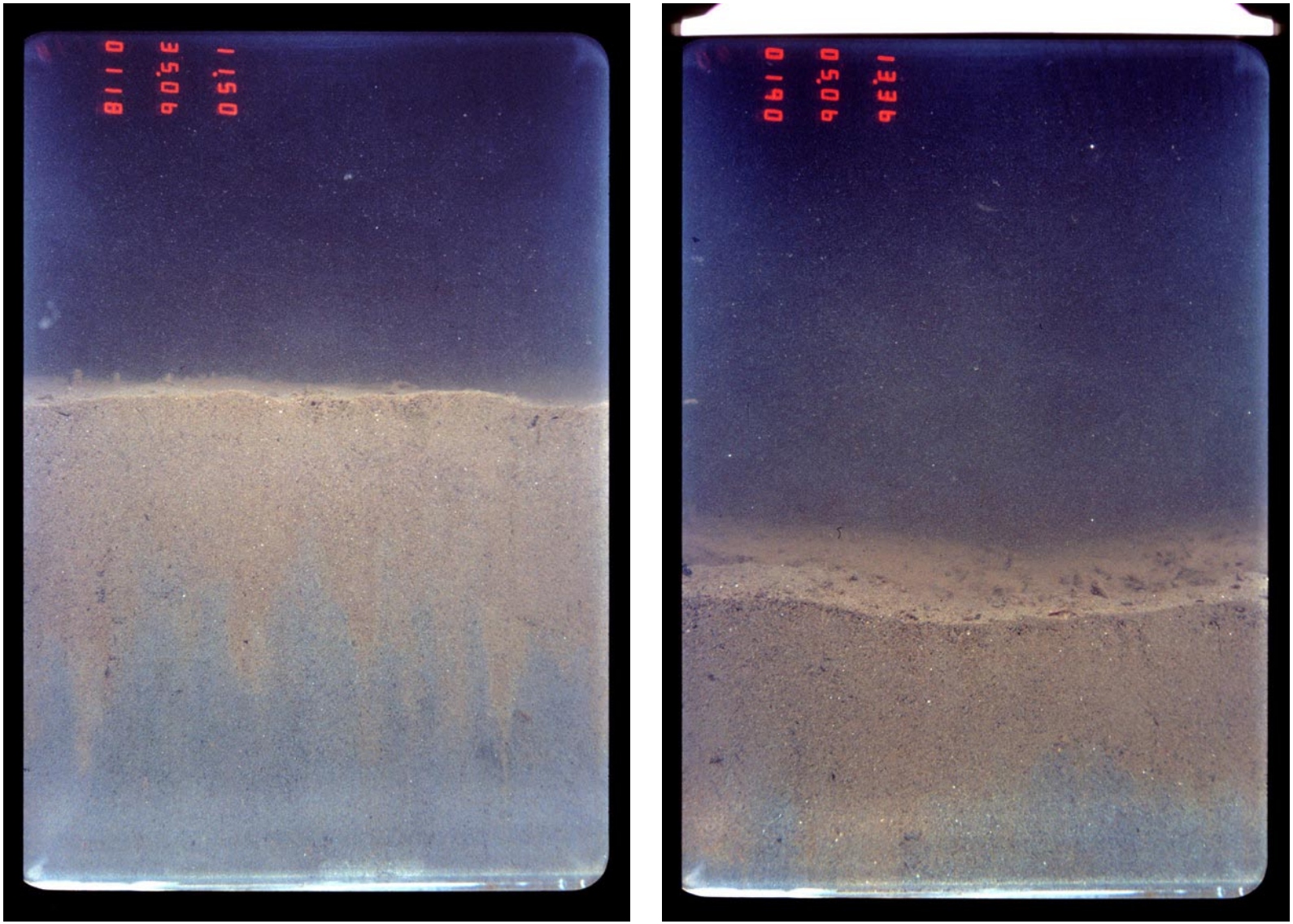
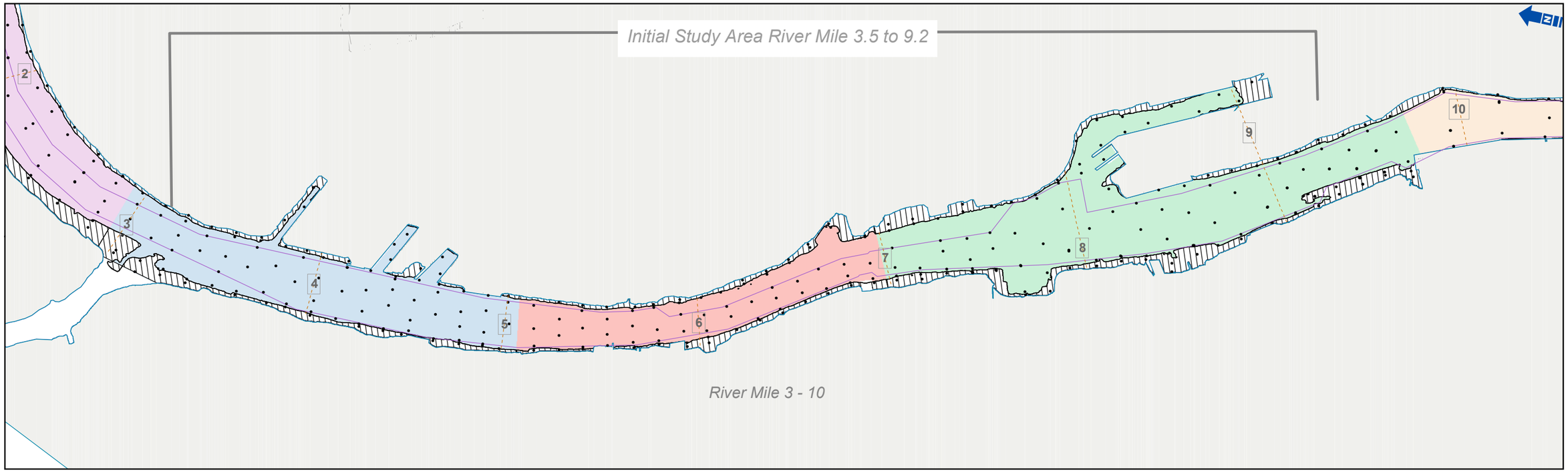
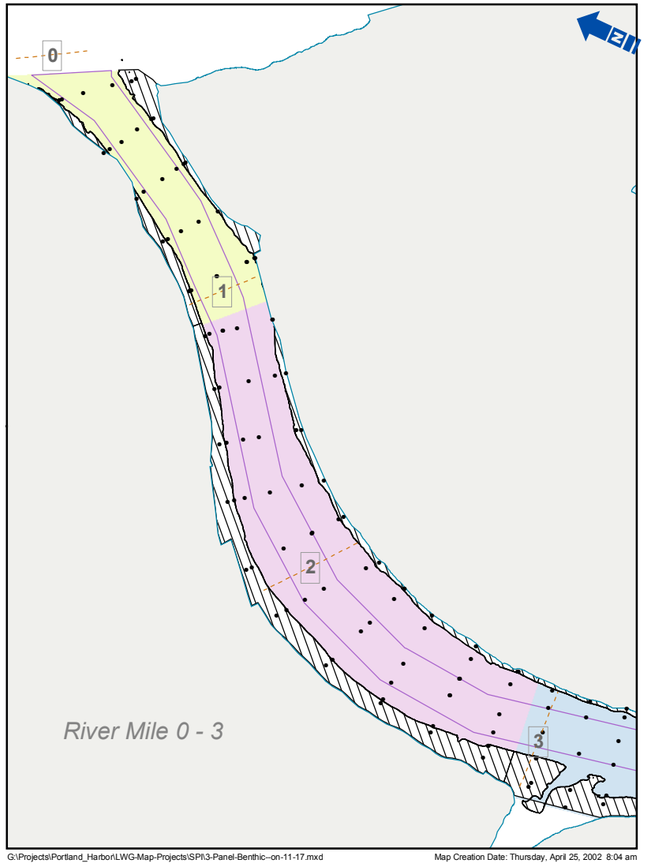
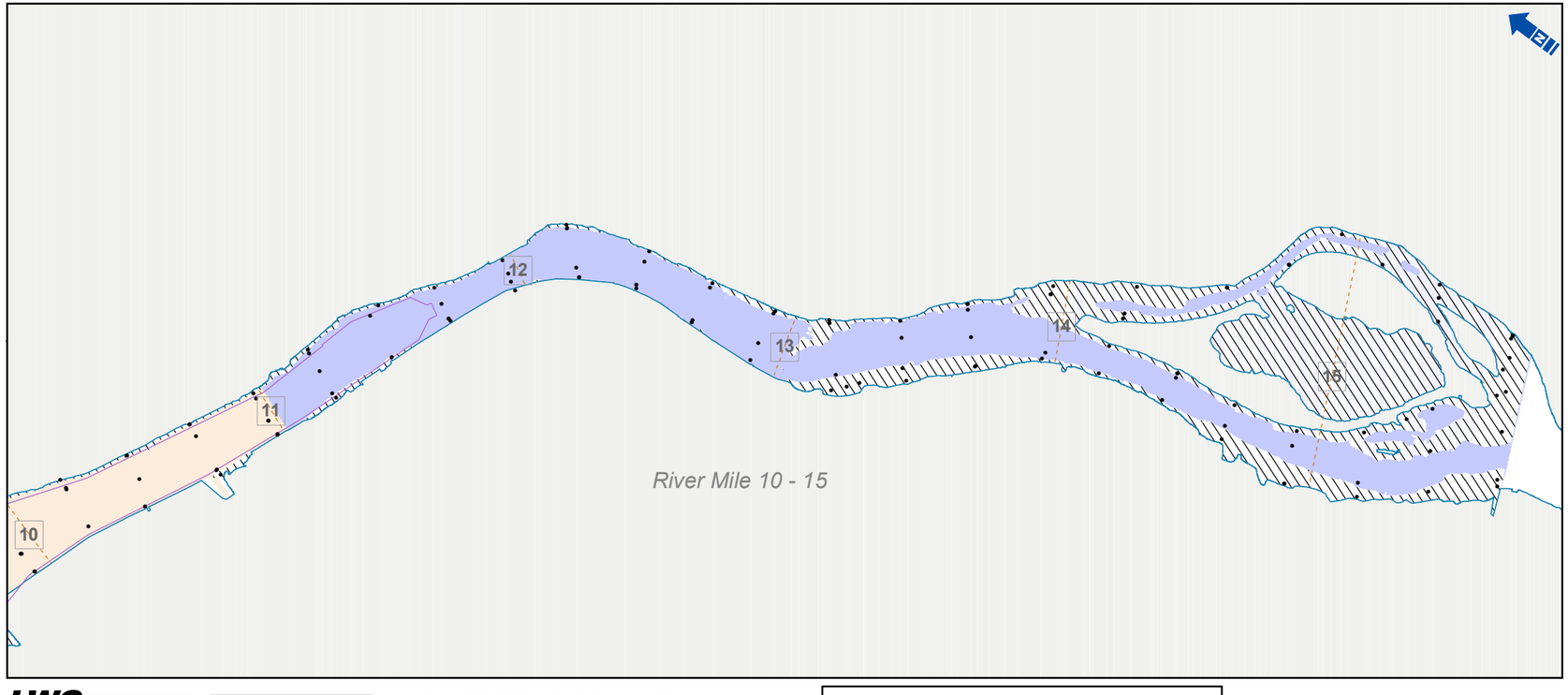


Figure 3-26. Representative SPI images from Stations 4A (left) and 2A (right), located in the nearshore areas of the 1.1 to 0 mile segment of the lower Willamette River.
Left: Station 4A is a tan to gray, poorly sorted silty fine sand with tubes at the SWI, organic particles interspersed throughout sediment column, a deep RPD, and appears to be depositional.
Right: Station 2A is a tan to gray, moderately sorted fine sand with tubes at SWI and a void lower mid-left. The surface roughness appears to be the result of physical forces. This is likely an area of sediment transport.

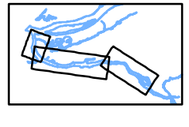






LWG Lower Willamette Group

TRIPLIN Environmental Associates



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FEATURE SOURCES:
Transportation, Water, Property,Zoning or Boundaries: Metro RLIS .
Channel: Developed from US Army Corps of Engineers information.
Benthic SPI Zones: Areas delineated around zone classifications
Ref.: 2001 SPI survey.

- Columbia River Zone
- Depositional Zone 3
- Depositional Zone 2 (Transitional)
- Transport/Non-Depositional Zone
- Depositional Zone 1
- Transition to Deposition Zone 1
- Chute
- Nearshore Zone
- Navigation Channel
- 2001 SPI Stations

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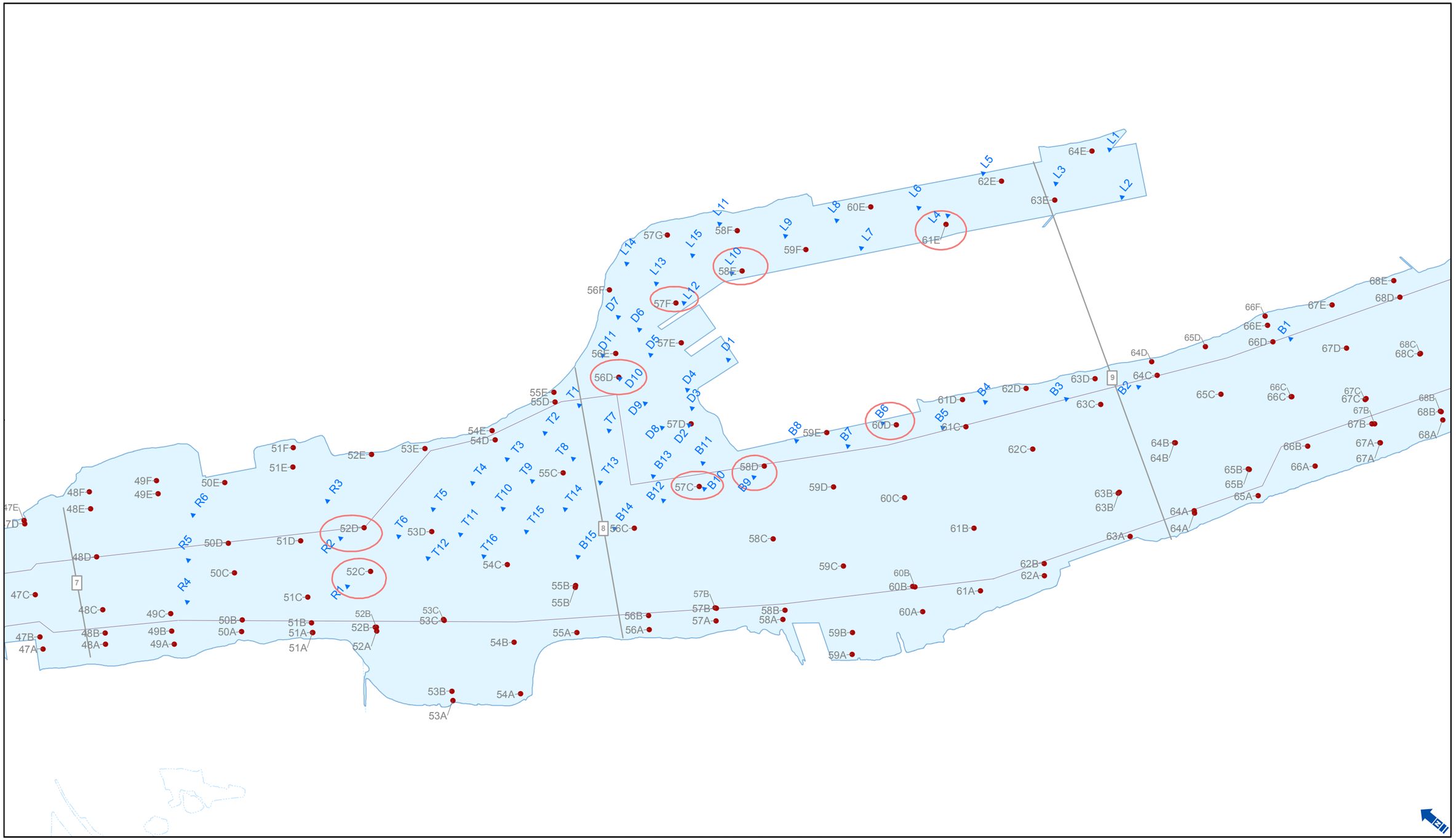
Map Creation Date: Thursday, April 25, 2002 8:04 am

Lower Willamette River Benthic Zones Figure 4-1



Legend

- 2001 SPI Stations
- 1998 SPI Stations
- Stations paired for temporal comparison

FEATURE SOURCES:
Transportation, Water, Property,Zoning or Boundaries:
Metro RLIS .
Channel:
Developed from US Army Corps of Engineers information.
Sediment Profile Imagery Point Data:
SEA shape point file created using SPI survey December 2001 GPS coordinates.

DRAFT DOCUMENT: DO NOT QUOTE OR CITE
This document is currently under review by US EPA and its federal, state and tribal partners, and is subject to change in whole or in part.

0 500 1,000 2,000 Feet
Scale: 1" = 1000'

Lower Willamette River
2001 SPI Results with 1998 Shipyard SPI locations
Figure 4-2

Map Creation Date: Wednesday, April 24, 2002 11:42 am
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Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
1A	B	34.2	12/06/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
1B	A	44.8	12/06/01	3.73	0.87	>3.73	4-3	0	0	0.00	2
1C	A	51.7	12/06/01	8.35	0.45	3.67	4-3	0	0	0.00	2
1D	B	49.9	12/06/01	6.52	0.52	3.74	4-3	0	0	0.00	2
1E	B	14.0	12/06/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
1F	A	15.4	12/06/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
2A	C	13.9	12/06/01	7.24	0.60	4.33	4-3	1	0	0.00	1 on 3
2B	A	31.7	12/06/01	5.78	3.00	Ind	4-3	0	0	0.00	Ind
2C	A	52.1	12/06/01	5.10	0.47	2.04	3-2	0	0	0.00	1
2D	C	57.2	12/06/01	7.24	0.87	3.91	4-3	2	0	0.00	2 on 3
2E	A	27.4	12/06/01	9.74	1.00	>9.74	4-3	0	0	0.00	1
2F	C	11.7	12/06/01	7.19	0.57	3.42	4-3	1	0	0.00	2 on 3
3A	A	14.1	12/06/01	7.69	0.47	2.29	4-3/>4	2	0	0.00	1 on 3
3B	C	42.4	12/06/01	6.76	0.47	>6.76	4-3	0	0	0.00	2
3C	C	54.1	12/06/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
3D	A	50.2	12/06/01	4.61	0.85	3.92	>4	5	0	0.00	2 on 3
3E	B	25.5	12/06/01	8.54	1.15	2.16	4-3	0	0	0.00	1
3F	A	10.4	12/06/01	8.65	0.57	>8.65	4-3	0	0	0.00	2
4A	A	9.5	12/06/01	12.31	0.42	4.84	4-3	0	0	0.00	2
4B	B	30.8	12/06/01	8.25	0.92	4.48	4-3	0	0	0.00	2
4C	A	47.7	12/06/01	5.83	0.47	>5.83	4-3	0	0	0.00	2 on 3
4D	B	51.6	12/06/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
4E	C	26.9	12/06/01	11.16	2.02	2.95	4-3	0	0	0.00	1 -> 2
5A	B	10.8	12/06/01	9.59	2.10	1.36	4-3	0	0	0.00	1
5B	A	22.7	12/06/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
5B	F	24.8	12/10/01	17.82	1.00	6.14	>4-3	2	0	0.00	1 on 3
5C	B	56.3	12/06/01	0.13	0.53	Ind	4-3	Ind	Ind	Ind	Ind
5C	D	55.1	12/10/01	1.21	0.40	>1.21	4-3	0	0	0.00	1
5D	A	54.0	12/06/01	12.87	0.62	1.81	4-3	1	6	1.16	1 on 3
5D	C	53.9	12/06/01	11.78	0.92	1.12	4-3/>4	1	0	0.00	1 on 3
5E	D	27.0	12/06/01	0.98	1.17	Ind	>4	0	0	0.00	Ind
5E	E	26.6	12/10/01	2.79	1.57	1.27	4-3/>4	0	0	0.00	1
6A	A	8.7	12/06/01	0.00	0.00	Ind	Ind	Ind	Ind	Ind	Ind
6B	A	34.3	12/06/01	11.66	2.67	2.95	>4	1	0	0.00	1 on 3
6C	A	50.6	12/06/01	4.90	0.85	>4.90	4-3	0	0	0.00	2 on 3
6C	D	50.7	12/10/01	6.74	0.57	5.13	4-3/>4	0	0	0.00	1
6D	A	60.3	12/06/01	13.06	2.25	1.99	>4-3	3	0	0.00	1 on 3
6E	B	15.5	12/06/01	0.38	1.02	Ind	>4	Ind	Ind	Ind	Ind
6E	D	18.4	12/10/01	1.10	1.37	>1.10	4-3	0	0	0.00	1
7A	C	12.5	12/06/01	12.09	1.02	1.40	>4	0	16	2.52	1
7B	B	28.4	12/06/01	11.55	1.52	1.90	>4	5	0	0.00	1 on 3
7C	A	59.6	12/06/01	12.68	0.40	2.27	>4	2	0	0.00	3
7D	A	49.2	12/06/01	16.32	0.65	5.45	>4	5	0	0.00	1 on 3
7E	A	9.0	12/06/01	7.12	1.32	>7.12	4-3	0	0	0.00	1
8A	A	13.6	12/05/01	5.76	0.85	>5.76	>4	0	0	0.00	1

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
8B	A	26.8	12/05/01	13.59	1.33	1.52	>4	3	0	0.00	1 on 3
8C	C	47.7	12/05/01	14.24	0.55	1.34	>4	2	0	0.00	1 on 3
8D	C	57.2	12/05/01	11.34	0.18	2.44	>4	0	0	0.00	2
8E	C	23.5	12/05/01	13.62	0.55	5.90	>4	1	0	0.00	1 on 3
8F	C	12.9	12/05/01	7.12	1.45	5.71	>4-3	0	0	0.00	1
9A	A	15.3	12/05/01	12.74	1.10	2.00	>4-3	0	0	0.00	1
9B	A	25.0	12/05/01	15.59	0.50	2.89	>4	1	0	0.00	1 on 3
9C	A	29.5	12/05/01	15.43	3.22	2.98	>4	1	0	0.00	1 on 3
9D	C	53.8	12/05/01	1.65	0.22	0.72	4-3	0	0	0.00	1
9E	A	47.1	12/10/01	17.18	2.32	12.00	>4	0	0	0.00	1
9F	B	13.4	12/10/01	8.33	1.25	5.83	>4	1	0	0.00	1 on 3
10A	B	9.4	12/05/01	6.29	0.57	2.41	>4/4-3	0	0	0.00	1
10B	A	22.6	12/05/01	17.08	2.05	3.27	>4	3	1	0.25	1 on 3
10C	C	49.8	12/05/01	11.29	0.18	2.90	>4	0	0	0.00	2
10D	B	52.4	12/05/01	>21.25	Ind	>9.50	>4	2	11	0.93	3
10D	E	51.1	12/10/01	17.55	0.60	>17.55	>4	0	0	0.00	1
10E	A	29.6	12/05/01	18.03	0.62	5.30	>4	2	13	2.69	1 on 3
10F	B	11.0	12/05/01	5.05	0.95	>5.05	4-3	0	0	0.00	1
11A	B	11.8	12/05/01	14.64	2.35	5.40	>4	1	0	0.00	1 on 3
11B	A	25.5	12/05/01	19.30	2.10	7.94	>4	6	0	0.00	1 on 3
11C	A	50.3	12/05/01	18.82	0.60	4.21	>4	3	0	0.00	1 on 3
11D	C	52.8	12/05/01	7.47	0.32	4.36	>4/3-2	0	0	0.00	1
11E	A	61.3	12/05/01	19.98	0.80	6.30	>4	4	0	0.00	1 on 3
11F	C	11.9	12/05/01	10.97	1.60	7.76	3-2/>4	2	3	1.08	1 on 3
12A	A	14.0	12/05/01	15.58	1.85	5.89	>4	0	5	0.27	1
12B	A	25.5	12/05/01	18.51	0.57	5.32	>4	3	0	0.00	1 on 3
12C	A	51.6	12/05/01	17.68	0.27	8.79	>4	0	4	0.46	1
12D	B	45.8	12/05/01	19.32	1.50	14.44	>4/4-3	0	0	0.00	1
12E	B	44.3	12/05/01	20.60	1.40	6.48	>4	6	0	0.00	1 on 3
12F	B	18.7	12/05/01	1.55	2.80	Ind	3-2	0	0	0.00	Ind
12F	C	19.9	12/05/01	6.30	1.00	3.21	3-2	0	0	0.00	1
13A	B	12.4	12/05/01	10.14	1.15	7.05	>4/4-3	0	0	0.00	1
13B	A	27.5	12/05/01	16.34	0.22	4.95	>4	2	0	0.00	3
13C	C	48.6	12/05/01	17.64	1.00	5.00	>4	2	0	0.00	1 on 3
13D	C	53.7	12/05/01	13.07	1.70	5.83	>4/4-3	0	0	0.00	1 on 3
13E	C	41.9	12/05/01	19.90	0.45	7.73	>4	3	0	0.00	1 on 3
13F	A	11.9	12/05/01	11.12	1.40	4.93	>4/4-3/>4	2	0	0.00	3
14A	A	8.0	12/05/01	9.57	0.30	4.96	>4/4-3	0	0	0.00	1
14B	A	27.0	12/05/01	14.98	0.73	4.04	>4	2	0	0.00	1 on 3
14C	B	57.7	12/05/01	>21.19	Ind	>12.99	>4	0	0	0.00	Ind
14C	E	56.2	12/10/01	17.12	0.62	>17.12	>4	0	0	0.00	1
14D	C	51.9	12/05/01	>21.25	Ind	>7.50	>4	4	0	0.00	3
14D	E	50.4	12/10/01	14.22	1.70	12.17	>4	0	0	0.00	1
14E	B	48.1	12/05/01	20.34	0.45	5.95	>4	2	0	0.00	1 on 3
14F	A	19.4	12/05/01	10.80	3.47	3.14	>4/3-2/>4	2	0	0.00	1 on 3

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
15A	B	15.1	12/05/01	4.79	1.20	3.34	4-3	0	0	0.00	1
15B	A	22.2	12/05/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
15B	E	20.4	12/10/01	1.90	0.60	>1.90	3-2	0	0	0.00	1
15C	A	50.6	12/05/01	19.61	1.02	7.63	>4	1	0	0.00	1 on 2
15D	B	52.1	12/05/01	18.75	0.75	9.63	>4	3	4	0.67	1 on 3
15E	A	43.1	12/05/01	17.77	0.40	5.94	>4	5	3	0.40	1 on 3
15F	B	18.2	12/05/01	6.08	2.20	4.34	>4	0	0	0.00	1
15F	C	18.6	12/05/01	10.99	5.37	Ind	>4-3	1	1	0.69	1 on 3
16A	C	10.8	12/05/01	2.42	2.62	Ind	3-2	0	0	0.00	1
16A	H	11.5	12/10/01	8.55	0.32	3.49	>4/4-3	0	0	0.00	1
16B	C	22.9	12/05/01	0.99	0.92	>0.99	4-3	0	0	0.00	1
16B	G	21.0	12/10/01	0.32	0.62	>0.32	4-3	0	0	0.00	2
16C	A	51.0	12/05/01	12.92	0.90	4.91	>4	1	5	1.42	1 on 3
16D	A	50.0	12/05/01	20.70	0.35	8.05	>4	2	0	0.00	1 on 3
16E	D	39.0	12/05/01	10.03	0.87	4.37	>4	2	0	0.00	1 on 3
17A	A	13.9	11/27/01	2.80	1.37	Ind	3-2	0	0	0.00	2
17B	A	17.8	11/27/01	5.98	0.72	2.43	3-2	0	0	0.00	1
17C	A	46.7	11/27/01	17.81	0.65	2.40	>4	0	0	0.00	1
17D	A	49.3	11/27/01	20.93	0.22	3.51	>4	5	0	0.00	1 on 3
17E	B	14.8	11/27/01	12.57	0.87	2.60	3-2/>4	1	0	0.00	1 on 3
18A	C	15.0	11/27/01	8.98	2.47	>8.98	>4	3	2	0.37	1 on 3
18B	C	25.3	11/27/01	7.65	0.68	1.93	4-3	0	0	0.00	1
18C	A	45.0	11/27/01	15.92	2.32	1.71	>4	0	0	0.00	2
18D	A	49.2	11/27/01	15.65	0.45	2.88	>4	1	2	4.76	1 on 3
18E	A	43.8	11/27/01	20.95	1.02	3.03	>4	2	0	0.00	1 on 3
18F	A	4.0	11/27/01	3.26	2.62	Ind	3-2	0	0	0.00	1
19A	A	2.8	11/27/01	1.28	1.80	Ind	4-3	0	0	0.00	1
19B	C	20.4	11/27/01	7.20	1.60	3.67	>4	0	0	0.00	3
19C	A	47.7	11/27/01	3.55	0.57	Ind	4-3	0	0	0.00	1
19D	A	45.5	11/27/01	13.71	1.95	2.42	>4	1	0	0.00	1 on 3
19E	B	8.2	11/27/01	7.06	1.30	2.47	4-3	0	0	0.00	1
20A	A	34.7	11/27/01	15.36	1.85	4.03	>4	2	0	0.00	3
20B	B	46.3	11/27/01	17.53	0.35	1.71	>4-3	0	0	0.00	1
20C	A	53.9	11/27/01	12.23	1.47	2.53	>4-3	0	0	0.00	1
20D	A	30.3	11/27/01	20.06	1.50	2.82	>4	1	11	0.84	1 on 3
20E	A	10.0	11/27/01	13.97	2.45	2.39	>4-3	2	3	0.20	1 on 3
21A	B	9.3	11/27/01	13.08	1.10	3.75	>4	0	0	0.00	1 on 3
21B	A	35.2	11/27/01	21.15	0.42	2.82	>4	1	7	1.48	1 on 3
21C	A	50.9	11/27/01	2.46	0.40	Ind	>4	0	0	0.00	3
21D	B	49.3	11/27/01	18.03	0.50	2.87	>4	1	1	0.21	1 on 3
21E	C	21.4	11/27/01	11.61	0.35	1.38	4-3	0	0	0.00	1
21F	A	9.8	11/27/01	8.64	2.55	1.17	4-3	0	0	0.00	1
22A	B	10.0	11/27/01	9.46	2.20	1.96	4-3/>4	0	4	1.94	1
22B	B	43.9	11/27/01	20.58	1.52	0.91	>4	4	16	0.77	3
22C	A	53.5	11/27/01	18.95	0.47	3.53	>4	2	3	0.55	1 on 3

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
22D	A	18.4	11/27/01	19.74	0.75	2.12	>4	0	18	1.71	1
22E	C	9.0	11/27/01	5.50	1.10	1.19	4-3	0	0	0.00	1
22F	B	36.4	11/27/01	20.63	2.22	1.55	>4	0	>25	3.45	1
22H	B	17.1	11/27/01	18.93	0.67	2.77	>4	0	0	0.00	1
23A	B	9.8	11/27/01	6.22	1.77	3.11	>4-3	0	0	0.00	1
23B	A	37.1	11/27/01	18.12	0.75	3.00	>4	2	2	0.55	1 on 3
23C	B	46.8	11/27/01	6.14	1.25	Ind	3-2	0	0	0.00	Ind
23D	C	38.9	11/27/01	18.03	1.42	3.39	>4	3	0	0.00	1 on 3
23E	A	11.9	11/27/01	12.10	2.05	2.82	>4-3	1	0	0.00	1 on 3
24A	A	8.1	11/27/01	17.11	2.15	3.38	>4	2	1	0.17	3
24B	B	33.6	11/27/01	19.44	0.65	3.11	>4	0	8	3.49	1
24C	B	46.4	11/27/01	19.49	0.65	2.78	>4	0	0	0.00	1
24D	A	56.6	11/27/01	19.99	0.85	2.52	>4	3	0	0.00	3
24E	B	27.1	11/27/01	14.99	2.05	3.50	>4	0	0	0.00	1
25A	A	36.8	11/27/01	20.15	3.07	3.07	>4	2	18	2.82	1 on 3
25B	A	56.9	11/27/01	5.88	1.62	2.89	4-3	1	0	0.00	1 on 3
25C	A	50.8	11/27/01	8.76	0.47	4.04	>4	0	0	0.00	1
25C	B	50.1	11/27/01	19.20	1.67	3.20	>4	2	0	0.00	1 on 3
25D	C	9.8	11/27/01	6.04	1.65	4.34	>4	0	0	0.00	1 on 3
26A	B	4.5	11/27/01	12.00	0.60	3.12	4-3/>4	0	0	0.00	1
26B	A	19.7	11/27/01	13.68	1.55	2.59	>4	3	0	0.00	3
26C	A	48.2	11/27/01	19.74	0.10	2.98	>4	2	0	0.00	3
26D	A	57.1	11/27/01	13.27	2.40	2.39	>4-3	1	0	0.00	1 on 3
26E	B	40.3	11/27/01	16.25	1.05	2.15	>4-3/>4	0	8	1.96	1
27A	C	7.1	11/27/01	6.79	0.62	2.37	>4-3	0	0	0.00	1
27B	A	28.5	11/27/01	19.37	1.35	3.08	>4	1	>25	4.50	1 on 3
27C	A	64.4	11/27/01	18.63	1.80	2.18	>4/3-2	2	0	0.00	1 on 3
27D	F	73.3	12/06/01	15.95	0.65	7.37	>4	3	0	0.00	1 on 3
27E	A	33.9	11/27/01	19.52	1.32	3.15	>4	0	20	3.56	1 on 3
27F	A	28.1	11/28/01	17.79	2.97	2.72	>4	0	15	5.14	1
27G	B	37.9	11/28/01	16.18	1.65	1.97	3-2/>4/3-2	0	0	0.00	1
27H	B	39.2	11/28/01	21.04	0.70	3.15	>4	0	1	0.15	1
27I	C	39.1	11/28/01	20.43	1.57	4.18	>4	2	0	0.00	1 on 3
28A	A	11.6	11/28/01	17.17	1.00	3.04	4-3	0	>20	4.66	1
28B	B	35.3	11/28/01	21.14	0.45	4.45	>4	1	14	5.59	1
28C	A	59.5	11/28/01	21.33	Ind	Ind	>4	0	12	1.72	Ind
28D	A	77.9	11/28/01	20.68	0.42	3.98	>4	0	0	0.00	2
28E	A	44.0	11/28/01	14.46	1.85	2.63	3-2/>4	0	10	4.36	3
28F	A	13.3	11/28/01	20.13	1.37	2.97	>4	0	37	2.82	1
29A	A	11.9	11/28/01	17.64	2.10	2.67	>4	0	19	1.53	1
29B	B	19.7	11/28/01	12.39	1.78	1.43	>4	6	2	1.06	3
29C	A	73.7	11/28/01	20.05	1.23	1.75	>4	2	3	0.06	1 on 3
29D	B	58.1	11/28/01	20.67	1.10	4.22	>4	3	3	0.57	1 on 3
29E	A	27.9	11/28/01	12.35	1.35	3.42	4-3/>4	1	1	0.18	1 on 3
29F	B	42.7	11/28/01	17.92	0.58	2.69	>4	1	0	0.00	1 on 3

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
29G	A	51.2	11/28/01	10.81	1.05	1.68	3-2/>4	1	0	0.00	1 on 3
30A	A	12.2	11/28/01	16.05	1.32	2.31	>4	8	7	0.51	1 on 3
30B	C	34.2	11/28/01	13.49	1.95	5.35	>4	1	12	1.11	1 on 3
30C	A	52.1	11/28/01	12.64	0.92	2.03	>4-3	0	0	0.00	1
30D	B	78.0	11/28/01	19.94	0.72	2.69	>4/3-2	2	0	0.00	1 on 3
30E	A	41.2	11/28/01	13.80	0.62	2.66	4-3/>4	2	2	0.29	1 on 3
31A	A	33.3	11/28/01	15.29	0.90	3.24	4-3/>4	0	29	4.60	1
31B	B	41.2	11/28/01	17.73	1.45	3.64	>4	0	49	8.34	1
31C	A	50.9	11/28/01	11.29	1.10	2.95	>4/3-2	0	0	0.00	1
31D	A	73.1	11/28/01	16.10	1.62	2.42	>4	4	0	0.00	1 on 3
31E	B	44.2	11/28/01	17.65	1.55	2.19	>4	4	7	0.15	1 on 3
32A	B	29.1	11/28/01	3.50	1.60	>3.50	>4	1	0	0.00	1 on 3
32B	A	82.1	11/28/01	17.71	0.57	2.65	>4	0	4	2.89	1
32C	A	42.3	11/28/01	20.43	0.50	2.92	>4	2	16	2.32	1 on 3
32D	A	24.4	11/28/01	16.07	0.30	2.88	4-3/>4	0	1	0.57	1 on 3
33A	C	15.3	11/28/01	6.56	2.92	1.94	4-3	0	0	0.00	1
33B	C	42.3	11/28/01	20.15	2.65	Ind	>4	0	6	0.39	1
33C	A	56.4	11/28/01	3.07	0.42	1.36	4-3	0	0	0.00	1
33D	B	51.2	11/28/01	2.42	0.50	0.40	3-2	0	0	0.00	Ind
34A	A	15.8	11/28/01	0.16	1.20	Ind	>4	0	0	0.00	Ind
34B	A	51.3	11/28/01	9.30	0.45	1.91	3-2/>4	0	0	0.00	1
34C	A	57.3	11/28/01	9.62	1.27	1.85	3-2/>4	0	0	0.00	1
34D	A	17.6	11/28/01	12.00	0.42	2.76	4-3/>4	1	0	0.00	1 on 3
35A	A	23.9	11/28/01	4.66	0.55	0.80	3-2/>4	0	0	0.00	1
35B	C	40.8	11/28/01	19.02	1.32	2.87	>4	0	26	7.61	1
35C	C	57.0	11/28/01	6.36	0.57	1.23	4-3	0	0	0.00	1
35D	B	44.2	11/28/01	18.01	0.62	3.24	4-3	0	24	6.03	1
35E	B	12.7	11/28/01	13.29	0.80	2.27	4-3/>4	1	6	0.49	1 on 3
36A	B	37.1	11/28/01	6.57	1.12	3.31	4-3	2	1	0.28	1 on 3
36B	B	52.1	11/28/01	7.29	0.10	1.43	3-2	0	0	0.00	1
36C	B	60.6	11/28/01	14.83	0.65	1.87	>4/3-2	0	0	0.00	1
36D	C	8.8	11/28/01	3.82	0.97	Ind	-4.00	0	0	0.00	1
37A	C	12.8	11/28/01	10.15	1.87	0.74	3-2	0	1	1.20	1
37B	A	49.5	11/28/01	12.73	0.70	2.77	>4	0	1	0.00	1
37C	A	50.1	11/28/01	3.54	1.02	Ind	3-2	0	0	0.00	Ind
37D	A	30.5	11/29/01	7.67	0.67	2.31	>4	0	0	0.00	1
37E	A	9.9	11/29/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
38A	B	18.9	11/29/01	4.76	2.42	3.73	>4	0	0	0.00	2
38B	B	42.9	11/29/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
38C	C	55.5	11/29/01	5.69	0.62	1.60	3-2	0	0	0.00	1
38D	A	36.2	11/29/01	8.62	0.55	2.17	3-2	0	0	0.00	1
38E	B	16.9	11/29/01	14.96	0.90	2.22	>4-3	0	0	0.00	1
39A	A	7.3	11/29/01	18.97	0.30	2.49	>4	0	28	1.66	1
39B	A	26.4	11/29/01	20.68	1.12	3.49	>4	0	18	4.07	1
39C	A	48.3	11/29/01	12.98	1.02	1.97	>4/3-2	1	0	0.00	1 on 3

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
39D	B	51.9	11/29/01	6.95	0.27	1.93	>4/3-2	0	0	0.00	1
39E	B	20.0	11/29/01	0.00	0.00	Ind	Ind	Ind	Ind	Ind	Ind
39F	C	10.4	11/29/01	4.51	2.07	2.29	>4-3	1	0	0.00	3
40A	A	9.3	11/29/01	17.22	0.80	3.25	>4	1	17	2.26	1 on 3
40B	C	24.5	11/29/01	15.75	1.67	3.15	>4	0	0	0.00	1
40C	A	51.9	11/29/01	17.65	0.57	3.11	>4	0	19	1.69	1
40D	C	54.2	11/29/01	5.05	1.35	>5.05	3-2	0	0	0.00	1
40E	B	32.9	11/29/01	11.76	0.77	Ind	4-3	0	0	0.00	Ind
41A	C	8.3	11/29/01	8.33	1.27	2.84	>4	7	0	0.00	3
41B	A	50.2	11/29/01	14.90	1.45	2.94	>4/4-3	0	0	0.00	1
41C	C	57.7	11/29/01	7.47	0.57	2.10	3-2	0	0	0.00	1
41D	C	28.2	11/29/01	14.96	2.62	3.73	>4	0	2	0.73	1
42A	B	6.6	11/29/01	14.24	2.05	1.61	>4	0	>50	5.14	1
42B	C	44.9	11/29/01	18.83	2.05	Ind	>4	0	>50	9.82	Ind
42C	C	54.2	11/29/01	6.21	0.65	1.40	4-3	0	0	0.00	1
42D	C	22.1	11/29/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
42E	B	8.2	11/29/01	5.32	3.45	2.34	4-3	0	0	0.00	1
43A	A	7.8	11/29/01	13.30	2.00	1.55	4-3	0	>50	14.46	1
43B	C	37.8	11/29/01	0.88	0.80	Ind	-2--3	0	0	0.00	Ind
43C	C	52.9	11/29/01	10.91	0.70	1.64	>4/4-3	0	0	0.00	1
43D	B	51.1	11/29/01	2.68	2.20	Ind	2-1	0	0	0.00	Ind
43E	B	32.7	11/29/01	7.55	2.82	1.78	4-3/>4	0	0	0.00	1
43F	C	12.9	11/29/01	12.26	0.57	2.77	4-3/>4	1	0	0.00	1 on 3
44A	A	9.9	11/29/01	11.81	0.60	1.89	>4/4-3/>4	0	0	0.00	1
44B	B	51.8	11/29/01	17.60	1.32	1.56	>4/3-2	0	0	0.00	1
44C	A	49.6	11/29/01	3.34	2.82	Ind	1-0	0	0	0.00	Ind
44D	B	25.5	11/29/01	0.38	2.02	Ind	>4	Ind	Ind	Ind	Ind
44E	C	7.9	11/29/01	14.95	1.00	Ind	2-1	0	0	0.00	Ind
45A	C	7.0	11/29/01	5.93	0.92	1.09	3-2	0	0	0.00	Ind
45B	B	46.6	11/29/01	15.28	1.35	0.90	>4/3-2	0	0	0.00	1
45C	C	52.8	11/29/01	10.92	0.20	1.44	3-2	0	0	0.00	1
45D	C	20.9	11/29/01	19.13	0.87	3.07	>4	4	28	3.07	1 on 3
45E	B	13.0	11/29/01	16.69	1.70	2.45	>4	2	1	0.27	1 on 3
46A	A	9.9	11/29/01	4.30	2.62	3.14	3-2	0	0	0.00	Ind
46B	A	29.0	11/29/01	5.96	1.90	2.95	4-3	0	0	0.00	1
46C	B	47.6	11/29/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
46D	B	48.9	11/29/01	6.76	0.80	1.55	3-2/>4	1	0	0.00	1 on 3
46E	C	36.7	11/29/01	18.14	1.00	3.31	>4	6	0	0.00	1 on 3
46F	A	17.7	11/29/01	17.79	1.05	3.51	>4	8	0	0.00	1 on 3
47A	C	19.1	11/29/01	15.04	3.05	2.25	>4	0	18	1.17	1
47B	A	38.1	11/29/01	19.09	0.42	3.65	>4	4	20	1.84	1 on 3
47C	A	54.3	11/29/01	4.55	1.07	Ind	3-2	0	0	0.00	Ind
47D	A	26.8	11/29/01	7.03	1.47	2.68	>4/3-2	1	0	0.00	1 on 3
47E	A	12.8	11/29/01	5.92	2.77	0.52	3-2	0	0	0.00	1
48A	B	16.7	11/29/01	17.05	0.90	2.34	>4	1	19	1.90	1 on 3

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
48B	B	28.1	11/29/01	16.35	3.72	3.42	>4	0	3	1.51	1
48C	A	48.3	11/29/01	20.94	0.63	4.07	>4	3	21	1.61	1 on 3
48D	B	57.7	11/29/01	18.08	0.50	2.32	>4/3-2	2	0	0.00	3
48E	A	17.9	11/29/01	12.04	1.13	4.46	>4	1	0	0.00	3
48F	B	10.0	11/29/01	13.57	2.47	2.98	>4	4	0	0.00	3
49A	A	7.4	11/29/01	12.04	1.42	1.57	>4-3	0	25	9.56	1
49B	A	19.8	11/29/01	13.35	1.22	3.80	>4	3	0	0.00	1 on 3
49C	B	41.9	11/29/01	20.83	1.30	3.94	>4	0	20	2.88	1
49E	A	20.4	11/30/01	8.03	1.42	1.88	4-3	0	0	0.00	1
49F	B	7.4	11/30/01	12.84	0.87	3.24	>4	1	6	0.65	1
50A	A	14.0	11/30/01	16.27	1.77	1.96	>4	2	5	0.35	1 on 3
50B	A	39.1	11/30/01	20.66	2.17	4.27	>4	0	24	2.23	1
50C	C	52.5	11/30/01	8.84	0.25	3.05	4-3	0	0	0.00	1
50D	C	66.6	11/30/01	20.84	0.90	4.41	>4	2	5	1.97	1 on 3
50E	A	21.0	11/30/01	20.16	1.17	3.65	>4	1	27	2.81	1 on 3
51A	B	15.3	11/30/01	12.15	0.95	1.69	4-3	0	0	0.00	1
51A	C	16.7	11/30/01	7.09	1.37	1.79	3-2	0	0	0.00	1
51B	A	35.5	11/30/01	20.25	0.82	4.30	>4	0	38	5.28	1
51C	A	46.4	11/30/01	>21.22	Ind	>3.44	>4	0	31	4.65	1
51D	B	65.7	11/30/01	19.92	1.37	4.50	>4	1	5	1.76	1 on 3
51E	A	20.6	11/30/01	16.07	0.52	2.62	>4	9	4	0.31	1 on 3
51F	B	15.6	11/30/01	10.69	3.92	2.96	>4	0	0	0.00	1
52A	B	13.1	11/30/01	17.64	1.02	3.84	>4	0	31	5.56	1
52B	A	21.3	11/30/01	>21.20	Ind	>2.37	>4	0	35	7.76	1
52B	D	20.4	12/07/01	16.99	2.62	8.56	>4	2	9	2.66	1 on 3
52C	A	52.7	11/30/01	8.41	1.02	2.62	>4/4-3	0	0	0.00	1
52D	B	54.0	11/30/01	15.17	0.73	2.10	>4	0	4	0.13	1
52E	B	22.0	11/30/01	14.29	1.52	2.21	3-2/>4	1	3	2.10	1 on 3
53A	B	17.0	11/30/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
53B	A	40.8	11/30/01	20.60	1.12	3.15	>4	0	46	3.60	1
53C	A	50.9	11/30/01	7.24	0.87	4.37	>4	0	0	0.00	1
53C	C	50.3	11/30/01	10.26	3.77	4.62	>4	3	1	0.06	1 on 3
53D	C	59.0	11/30/01	16.17	0.78	3.62	>4	1	0	0.00	1 on 3
53E	A	24.7	11/30/01	17.58	0.62	3.40	>4	2	9	2.56	1 on 3
54A	A	12.3	11/30/01	5.17	1.67	2.85	3-2	0	0	0.00	1
54B	B	32.1	11/30/01	6.38	2.10	0.99	>4	0	0	0.00	1
54C	B	50.4	11/30/01	15.82	1.60	2.98	>4	1	2	0.28	1 on 3
54D	A	39.0	11/30/01	19.46	0.92	4.34	>4	2	0	0.00	1 on 3
54E	C	25.5	11/30/01	15.82	1.72	3.94	>4	3	20	2.77	1 on 3
55A	A	15.0	11/30/01	4.03	0.65	2.36	4-3	0	0	0.00	1
55B	C	45.6	11/30/01	>21.29	Ind	>3.30	>4	3	36	4.34	3
55B	D	44.7	12/07/01	11.91	0.47	6.21	>4	2	0	0.00	1 on 3
55C	B	65.4	11/30/01	18.05	0.85	4.28	>4	3	1	0.04	1 on 3
55D	A	29.5	11/30/01	15.96	0.85	2.96	>4	7	3	1.68	1 on 3
55E	A	16.3	11/30/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
56A	B	11.6	11/30/01	16.84	1.67	2.37	>4-3	0	37	3.01	1 on 3
56B	B	32.8	11/30/01	13.53	0.95	0.97	3-2/>4	0	0	0.00	1
56C	C	56.0	11/30/01	20.02	0.62	5.66	>4	1	1	0.24	1 on 3
56D	A	41.7	11/30/01	14.97	0.35	1.57	>4	5	0	0.00	1 on 3
56E	C	45.1	11/30/01	18.37	1.32	4.11	>4	1	0	0.00	1 on 3
56F	C	23.8	11/30/01	4.57	0.70	3.33	3-2	0	0	0.00	1
57A	C	9.1	11/30/01	13.57	0.60	2.44	>4-3	0	0	0.00	1
57B	A	32.8	11/30/01	>21.24	Ind	>3.40	>4	1	28	4.01	3
57B	D	30.8	12/07/01	14.59	0.80	7.33	>4	1	1	0.10	1 on 3
57C	A	54.0	11/30/01	17.46	0.75	4.78	>4	1	0	0.00	1 on 3
57D	B	54.5	12/06/01	12.68	1.82	4.96	>4	1	0	0.00	3
57E	A	48.1	12/06/01	9.82	0.30	1.82	>4	3	0	0.00	1 on 3
57F	B	38.6	12/06/01	8.34	0.98	3.74	>4	1	0	0.00	1 on 3
57G	A	34.0	12/06/01	16.02	1.42	4.87	>4	0	31	2.75	1
58A	A	11.6	11/30/01	14.78	0.80	2.66	4-3/>4	0	39	6.59	1
58B	B	25.6	11/30/01	15.66	0.98	2.10	>4	4	49	8.44	1 on 3
58C	A	47.5	11/30/01	20.96	0.42	4.70	>4	2	7	1.22	1 on 3
58D	A	52.2	11/30/01	20.69	0.52	3.09	>4	2	6	0.48	1 on 3
58E	B	38.8	12/06/01	12.23	0.77	4.14	>4	1	1	1.01	1 on 3
58F	A	29.2	12/06/01	6.95	2.07	3.05	>4	0	0	0.00	1
59A	A	10.3	11/30/01	15.09	1.60	3.38	4-3	0	13	2.70	1
59B	C	19.0	11/30/01	8.06	0.82	0.72	3-2/>4-3	0	0	0.00	1
59C	A	35.1	11/30/01	18.78	1.70	2.58	>4	0	32	3.60	1
59D	A	53.9	11/30/01	20.57	0.63	3.74	>4	0	>32	4.75	1
59E	A	45.1	11/30/01	15.75	1.37	3.67	>4	2	1	0.19	1 on 3
59F	A	39.0	12/06/01	14.64	0.50	4.45	>4	4	1	0.11	1 on 3
60A	A	15.3	11/30/01	19.85	1.12	3.50	>4	6	35	5.10	1 on 3
60B	C	29.6	11/30/01	20.20	3.02	4.66	>4	0	34	10.61	1
60B	E	27.7	12/07/01	13.01	1.00	7.05	>4	1	0	0.00	1 on 3
60C	C	47.9	11/30/01	16.94	0.25	3.87	>4-3	0	3	1.29	1
60D	A	43.3	11/30/01	15.90	0.62	3.10	>4	4	0	0.00	1 on 3
60E	A	35.3	12/06/01	16.89	0.80	3.92	>4	3	15	1.55	1 on 3
61A	A	23.7	11/30/01	18.70	0.88	2.83	>4	1	62	4.47	1 on 3
61B	A	40.4	11/30/01	18.84	3.70	8.62	>4	0	17	4.44	3
61C	A	46.6	11/30/01	20.12	2.97	4.76	>4	2	10	1.45	1 on 3
61D	C	13.7	12/03/01	8.07	1.35	1.59	3-2	0	0	0.00	1
61E	D	40.7	12/10/01	14.04	1.62	4.44	>4	1	7	2.19	1 on 3
62A	B	8.0	12/03/01	14.01	1.50	4.03	>4	0	4	3.79	1
62B	A	39.6	12/03/01	17.29	1.55	3.23	>4	0	39	9.57	2
62C	C	59.0	12/03/01	20.91	0.92	4.35	>4	0	17	1.19	1
62D	C	11.4	12/03/01	6.38	1.55	>6.38	>4	0	0	0.00	1
62E	A	28.9	12/06/01	14.03	0.92	3.72	>4	5	0	0.00	1 on 3
63A	C	23.4	12/03/01	18.37	0.83	3.59	>4	0	51	19.86	1
63B	A	37.8	12/03/01	>21.13	Ind	>3.99	>4	1	29	3.54	3
63B	D	35.6	12/07/01	14.53	0.67	>14.53	>4	1	0	0.00	1 on 3

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Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
63C	A	64.7	12/03/01	18.29	1.20	3.41	>4	0	6	0.37	1
63D	A	23.9	12/03/01	13.15	1.12	2.93	>4-3	4	0	0.00	1 on 3
63E	A	26.8	12/06/01	20.30	0.80	4.83	>4	5	0	0.00	1 on 3
64A	A	32.6	12/03/01	>21.22	Ind	>4.58	>4	0	34	3.11	3
64A	D	32.1	12/07/01	13.91	1.55	5.92	>4	1	3	0.42	1 on 3
64B	B	47.4	12/03/01	>21.19	Ind	>6.98	>4	0	30	2.73	1
64B	E	45.6	12/07/01	12.56	2.27	>12.56	>4	0	0	0.00	1
64C	B	45.3	12/03/01	14.70	1.75	3.32	>4/3-2	1	0	0.00	1 on 3
64D	B	8.0	12/03/01	9.91	1.70	Ind	3-2	0	0	0.00	Ind
64E	B	20.0	12/06/01	15.72	0.47	46.12	4-3/>4	2	11	1.70	1 on 3
65A	A	17.4	12/03/01	17.80	0.80	4.19	>4	2	4	0.73	1 on 3
65B	C	25.5	12/03/01	>21.14	Ind	>7.98	>4	0	23	4.42	1
65B	E	23.8	12/07/01	13.46	0.50	8.13	>4	0	0	0.00	1
65C	A	51.8	12/03/01	12.20	1.25	0.12	>4	0	0	0.00	1
65D	C	11.3	12/03/01	7.17	0.45	Ind	3-2	0	0	0.00	Ind
66A	A	28.0	12/03/01	17.04	0.97	5.09	4-3/>4	0	22	3.56	2->3
66B	C	21.4	12/03/01	19.58	1.97	11.43	>4	0	13	2.54	1->2
66C	C	52.9	12/03/01	>21.21	Ind	>9.75	>4	0	0	0.00	3
66C	E	50.6	12/07/01	9.82	0.35	>9.82	>4	0	0	0.00	1
66D	B	44.4	12/03/01	15.00	0.62	4.08	>4	2	0	0.00	1 on 3
66E	B	23.5	12/03/01	13.54	0.92	3.34	>4/4-3/>4	0	0	0.00	2 --> 3
66F	A	7.1	12/03/01	4.20	1.15	0.68	3-2	0	0	0.00	1
67A	B	26.1	12/03/01	8.90	0.47	3.45	3-2	2	0	0.00	3
67A	C	26.7	12/03/01	10.72	0.22	3.71	4-3/>4	2	0	0.00	3
67B	A	19.9	12/03/01	>21.27	Ind	>11.64	>4	0	25	3.45	1
67B	E	18.2	12/07/01	18.88	0.55	>18.88	>4	0	0	0.00	1
67C	A	42.7	12/03/01	>21.33	Ind	>12.98	>4	0	0	0.00	Ind
67C	F	40.7	12/07/01	14.61	1.85	>14.61	>4	0	0	0.00	1
67D	C	80.8	12/03/01	17.40	1.20	1.07	>4	0	12	1.34	1
67E	B	18.5	12/03/01	12.21	2.80	5.08	>4-3	1	0	0.00	1 on 3
68A	A	23.1	12/03/01	18.93	0.72	4.55	>4	0	17	6.37	1
68B	B	25.8	12/03/01	>21.29	Ind	>8.55	>4	0	31	3.02	1
68B	F	22.9	12/07/01	15.91	0.17	13.69	>4	0	0	0.00	1
68C	A	59.4	12/03/01	>21.17	Ind	Ind	>4	0	0	0.00	Ind
68C	D	57.8	12/07/01	9.02	1.15	>9.02	>4	0	0	0.00	1
68D	A	44.8	12/03/01	17.68	0.65	3.46	>4-3	1	2	0.24	1 on 3
68E	A	9.3	12/03/01	1.96	1.40	>1.96	>4-3	0	0	0.00	1
69A	B	9.1	12/03/01	6.81	2.35	4.18	4-3	0	0	0.00	1
69B	A	21.6	12/03/01	16.36	0.75	3.19	>4	2	17	3.75	1 on 3
69C	A	32.9	12/03/01	15.65	1.08	4.95	>4	1	9	1.06	1 on 3
69D	C	79.6	12/03/01	20.71	0.60	4.26	4-3/>4	0	11	3.26	1
69E	A	15.1	12/03/01	19.39	0.52	5.47	>4	1	3	0.42	2 -> 3
70A	A	44.6	12/03/01	>21.31	Ind	>7.60	>4	0	12	8.43	1
70A	E	42.9	12/07/01	13.00	2.95	>13.00	>4	0	0	0.00	1
70B	C	48.0	12/03/01	>21.19	Ind	>15.89	>4	1	0	0.00	3

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
70B	E	46.3	12/07/01	11.11	1.55	>11.11	4-3/>4	1	0	0.00	1 on 3
70C	A	33.2	12/03/01	13.05	1.12	3.65	4-3/>4	0	0	0.00	1
70D	A	14.0	12/03/01	1.03	1.08	Ind	>4	0	0	0.00	Ind
71A	B	48.1	12/03/01	14.38	0.95	1.56	>4	4	0	0.00	3
71B	C	47.9	12/03/01	>21.28	Ind	>10.97	>4	2	1	0.07	3
71B	G	45.1	12/07/01	11.76	0.80	9.91	>4	0	0	0.00	1
71C	B	12.7	12/03/01	Ind	Ind	Ind	>4	0	0	0.00	Ind
72A	C	40.6	12/03/01	3.36	0.22	2.15	3-2	0	0	0.00	1
72B	A	60.2	12/03/01	20.53	1.22	20.53	>4	0	0	0.00	3
72C	B	23.7	12/03/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
73A	C	15.5	12/03/01	14.67	0.72	4.30	>4	1	3	0.18	1 on 3
73B	C	33.4	12/03/01	>21.30	Ind	>12.13	>4	0	4	0.51	1
73B	F	32.9	12/07/01	14.34	0.92	>14.34	>4	0	0	0.00	1
73C	A	51.2	12/03/01	7.65	1.13	1.64	>4	0	0	0.00	1
73D	A	20.0	12/03/01	19.30	1.82	9.55	>4/4-3	0	0	0.00	1 on 3
73D	C	20.3	12/03/01	19.28	2.45	8.73	>4/4-3	3	0	0.00	1 on 3
74A	E	29.9	12/03/01	>21.15	Ind	>14.95	>4	0	6	1.66	1
74A	F	25.5	12/07/01	18.16	0.90	16.95	>4	0	0	0.00	1
74B	C	58.4	12/03/01	>21.19	Ind	>21.19	4-3/>4	1	0	0.00	3
74B	E	56.5	12/07/01	8.72	2.02	Ind	4-3	0	0	0.00	1
74C	B	48.1	12/03/01	6.16	0.95	1.62	3-2/>4	0	0	0.00	1
74D	B	18.3	12/03/01	12.83	1.22	>12.83	>4	3	0	0.00	3
75A	D	13.3	12/03/01	18.64	0.75	9.12	4-3	0	0	0.00	1
75B	C	33.3	12/03/01	17.19	1.20	8.68	>4-3	0	0	0.00	1
75C	B	52.0	12/03/01	2.25	1.48	Ind	-3 - -4	0	0	0.00	Ind
75D	D	45.9	12/03/01	3.38	0.30	>3.38	4-3	0	0	0.00	1
75E	E	24.9	12/03/01	6.50	3.12	>6.50	>4	0	0	0.00	1
76A	A	19.3	12/03/01	20.73	1.25	11.61	4-3/>4/4-3	0	0	0.00	1
76B	A	63.2	12/04/01	2.75	3.17	Ind	3-2	0	0	0.00	1
76C	A	27.5	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
77A	B	41.2	12/04/01	11.30	1.65	3.48	4-3	1	4	6.10	1 on 3
77B	A	51.3	12/04/01	12.84	0.47	Ind	4-3/>4	0	29	6.77	1
77B	C	51.1	12/04/01	11.37	2.90	1.72	4-3/>4	2	6	1.09	1 on 3
77C	A	53.2	12/04/01	2.04	2.00	Ind	0 - -1	0	0	0.00	Ind
77D	C	31.8	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
78A	A	14.2	12/04/01	17.84	1.10	16.36	>4	0	0	0.00	1
78B	A	54.0	12/04/01	3.08	1.62	Ind	-2 - -3	0	0	0.00	Ind
78C	A	69.7	12/04/01	4.14	1.77	Ind	2-1	0	0	0.00	Ind
78D	B	49.4	12/04/01	0.00	Ind	Ind	-3 - -4	Ind	Ind	Ind	Ind
79A	A	34.7	12/04/01	5.75	2.77	>5.75	4-3/>4	0	0	0.00	1
79A	C	34.4	12/04/01	19.31	2.45	9.92	4-3/>4	0	0	0.00	1
79B	C	44.6	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
79C	B	34.2	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
79D	B	18.3	12/04/01	0.26	1.53	Ind	Ind	Ind	Ind	Ind	Ind
80A	C	35.3	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
80B	B	37.5	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
80C	B	52.7	12/04/01	6.18	3.42	1.26	3-2/4-3	0	0	0.00	1
80D	B	27.8	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
81A	A	36.3	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
81B	C	40.2	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
81C	A	39.4	12/04/01	4.04	1.07	Ind	-1 - -2	0	0	0.00	Ind
81D	B	28.1	12/04/01	0.57	1.40	Ind	2-1	Ind	Ind	Ind	Ind
82A	A	39.3	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
82B	A	38.9	12/04/01	2.68	1.82	Ind	1-0	0	0	0.00	Ind
82C	A	29.2	12/04/01	12.06	1.35	2.90	4-3/>4	2	0	0.00	1 on 3
82D	C	7.6	12/04/01	17.37	0.67	7.25	>4/4-3/>4	4	0	0.00	1 on 3
83A	A	10.0	12/04/01	20.54	1.07	6.34	>4	2	0	0.00	1 on 3
83B	B	13.5	12/04/01	7.30	2.05	4.12	>4	0	0	0.00	1
83C	A	14.1	12/04/01	9.59	0.95	5.23	>4-3	0	0	0.00	1
83D	B	30.0	12/04/01	9.35	1.62	2.11	4-3/>4	3	0	0.00	1 on 3
83F	C	22.1	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
83G	C	16.5	12/04/01	9.64	0.85	2.60	4-3	2	0	0.00	1 on 3
84A	A	10.5	12/04/01	2.64	0.75	>2.64	>4	0	0	0.00	1
84B	A	16.3	12/04/01	11.21	1.47	4.14	4-3/>4	2	0	0.00	1 on 3
84C	A	44.3	12/04/01	1.65	0.85	Ind	-1 - -2	0	0	0.00	1
84D	C	22.0	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
85A	B	15.6	12/04/01	>21.17	Ind	>9.63	>4	2	20	1.60	3
85A	E	14.9	12/07/01	16.22	1.10	11.91	>4	0	0	0.00	1
85B	A	43.4	12/04/01	1.83	4.20	Ind	-5 - -6	0	0	0.00	Ind
85C	B	41.0	12/04/01	9.50	0.92	2.64	4-3	1	0	0.00	1 on 3
85D	D	20.6	12/04/01	8.57	0.90	2.96	4-3	0	0	0.00	1
86A	C	20.1	12/04/01	3.17	0.62	>3.17	4-3	0	0	0.00	1
86B	C	35.9	12/04/01	3.19	0.77	Ind	-3 - -4	0	0	0.00	Ind
86C	B	22.1	12/04/01	3.05	6.22	1.94	-2 - -3	0	0	0.00	Ind
86C	C	22.0	12/04/01	4.98	0.75	3.46	4-3	0	0	0.00	1
86D	C	7.2	12/04/01	8.09	1.37	3.44	3-2	1	0	0.00	3
87A	C	17.5	12/04/01	6.42	1.62	>6.42	-2 - -3	0	0	0.00	Ind
87B	C	21.0	12/04/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
87C	C	4.5	12/04/01	3.46	0.95	>3.46	4-3	0	0	0.00	1
87D	C	14.8	12/04/01	11.83	1.20	4.03	4-3/>4	1	0	0.00	1 on 3
87E	C	4.6	12/04/01	12.78	2.42	3.36	4-3	1	0	0.00	2
88A	C	25.1	12/04/01	1.93	3.02	>1.93	>4	0	0	0.00	1
88B	A	51.4	12/04/01	3.86	1.63	Ind	-3 - -4	0	0	0.00	Ind
88C	A	16.7	12/04/01	5.40	1.22	>5.40	4-3	0	0	0.00	1
88C	C	18.6	12/04/01	4.13	0.97	Ind	-3 - -4	0	0	0.00	Ind
88E	B	12.1	12/07/01	16.81	1.55	9.54	>4	4	0	0.00	1 on 3
88E	C	14.7	12/07/01	15.96	1.37	7.16	>4-3	3	0	0.00	1 on 3
89A	B	15.8	12/07/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
89B	C	30.7	12/07/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
89C	B	15.1	12/07/01	0.00	Ind	Ind	-2 - -3	Ind	Ind	Ind	Ind

Table 3-1. Summary of SPI Results (see Appendix D for complete SPI results).

Station/ Rep		Depth MLLW (ft)	Date	Penetration Mean (cm)	Boundary Roughness (cm)	RPD Mean (cm)	Grain Size Major Mode (phi)	Number of Feeding Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
89H	A	18.9	12/07/01	18.70	3.45	Ind	4-3	Ind	Ind	Ind	Ind
89H	D	15.8	12/07/01	>21.22	Ind	>21.22	4-3/>4	0	0	0.00	1
90A	A	5.9	12/07/01	13.68	0.52	2.02	>4	6	1	0.06	1 on 3
90A	B	5.8	12/07/01	14.62	0.67	2.39	>4	1	66	4.33	1 on 3
90B	C	56.1	12/07/01	3.40	1.32	Ind	4-3	0	0	0.00	1
90C	C	16.3	12/07/01	12.33	1.50	>12.33	4-3/>4	0	0	0.00	1
90H	C	22.7	12/07/01	13.83	0.55	2.12	>4	1	0	0.00	1 on 3
91A	C	11.2	12/07/01	10.12	3.47	4.86	4-3	0	0	0.00	1
91B	A	42.5	12/07/01	11.59	0.75	7.78	4-3	0	0	0.00	1
91C	B	7.0	12/07/01	11.31	1.07	1.37	4-3	0	0	0.00	1
91G	A	8.6	12/07/01	8.53	0.55	4.58	4-3	0	0	0.00	1
92A	B	19.1	12/07/01	20.70	1.10	8.83	>4	0	3	0.35	1
92B	B	17.5	12/07/01	1.89	0.65	Ind	-2 - -3	0	0	0.00	1
92C	B	18.9	12/07/01	17.91	1.47	13.73	>4	2	0	0.00	1 on 3
92D	A	37.8	12/07/01	15.87	0.45	11.27	>4	1	0	0.00	1 on 3
92F	A	6.5	12/07/01	5.05	1.60	>5.05	4-3	0	0	0.00	1
92G	B	12.2	12/07/01	5.31	2.30	>5.31	4-3	0	0	0.00	1
92H	A	14.0	12/07/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
93A	B	1.9	12/07/01	9.78	0.97	6.45	>4	0	0	0.00	1
93B	A	6.5	12/07/01	20.36	0.85	11.72	>4	0	0	0.00	1
93C	A	32.4	12/07/01	11.54	1.07	5.05	4-3	0	0	0.00	3
93D	B	2.3	12/07/01	0.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind
93E	B	3.6	12/07/01	6.42	2.30	2.33	4-3	0	0	0.00	1
93F	B	2.5	12/07/01	4.02	2.00	>4.02	4-3	0	0	0.00	1
93G	B	5.5	12/07/01	4.91	2.95	2.53	4-3	0	0	0.00	1
93H	A	14.5	12/07/01	8.96	0.88	1.36	4-3/>4/4-3	0	0	0.00	1
93I	A	8.7	12/07/01	5.85	3.25	3.46	4-3/>4	0	0	0.00	1
93I	C	10.4	12/07/01	12.48	2.85	6.21	>4-3	0	0	0.00	1

Table 4-1. Cross-sectional Area of the Willamette River at Ten SPI Transects Throughout the Surveyed Area.

Transect	Segment	River Mile	Cross-sectional Area (sq.ft)	SPI Benthic Zone
4	Lower Willamette River	0.0 - 1.1	37,876	Columbia R. Zone
14	Lower Willamette River	1.1 - 3.0	65,183	Deposition Zone 3
20	Lower Portland Harbor	3.0 - 5.1	58,258	Deposition Zone 2
30	Lower Portland Harbor	3.0 - 5.1	67,653	Deposition Zone 2
36	Middle Portland Harbor	5.1 - 7.0	41,581	Transport Zone
43	Middle Portland Harbor	5.1 - 7.0	39,740	Transport Zone
51	Upper Portland Harbor	7.0 - 9.7	63,114	Deposition Zone 1
62	Upper Portland Harbor	7.0 - 9.7	59,412	Deposition Zone 1
75	Upper Willamette River	11 - 15.7	34,624	Chute
81	Upper Willamette River	11 - 15.7	29,881	Chute

Table 4-2. Comparison of SPI Results from Co-located Stations Sampled in April 1998 and December 2001.

Station/Rep		Interval	Year	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD Mean (cm)	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Methane Voids (#)	Methane Area (cm.sq)	Infaunal Succ. Stage
B2	B	14S	1998	8.19	7.45	9.07	1.61	2.39	1.70	4.24	>4	2	>4	0	0	0.00	1
64C	B	15S	2001	14.70	13.82	15.57	1.75	3.32	1.50	4.90	>4/3-2	0	>4	1	0	0.00	1 on 3
B6	C	4S	1998	21.00	20.26	22.26	2.00	6.96	4.82	7.21	>4	2	>4	0	27	2.98	1
60D	A	15S	2001	15.90	15.37	16.00	0.62	3.10	2.60	3.80	>4	2	>4	4	0	0.00	1 on 3
B9	A	14S	1998	15.25	14.99	15.75	0.76	4.93	3.91	7.24	>4	2	>4	2	12	1.76	1 on 3
58D	A	15S	2001	20.69	20.44	20.97	0.52	3.09	2.98	5.00	>4	0	>4	2	6	0.48	1 on 3
B10	A	14S	1998	14.32	13.99	15.05	1.06	3.87	2.82	5.15	>4	2	>4	4	11	2.10	1 on 3
57C	A	15S	2001	17.46	16.99	17.74	0.75	4.78	4.35	5.87	>4	1	>4	1	0	0.00	1 on 3
D10	A	14S	1998	18.63	17.99	19.48	1.48	5.37	4.33	5.12	>4	2	>4	1	3	0.53	1 on 3
56D	A	15S	2001	14.97	14.67	15.02	0.35	1.57	1.23	2.10	>4	3	>4	5	0	0.00	1 on 3
L5	A	14S	1998	21.63	20.84	21.87	1.03	3.33	5.09	6.97	>4	2	>4	1	15	3.78	1 on 3
61E	D	15S	2001	14.04	13.42	15.05	1.62	4.44	2.90	6.57	>4	2	>4	1	7	2.19	1 on 3
L10	A	14S	1998	19.20	18.63	19.87	1.24	4.93	5.39	9.33	>4	2	>4	3	4	2.06	1 on 3
58E	B	15S	2001	12.23	11.95	12.72	0.77	4.14	3.30	4.62	>4	1	>4	1	1	1.01	1 on 3
L12	C	14S	1998	16.09	15.11	16.69	1.58	3.05	1.67	5.88	>4	1	>4	0	0	0.00	1
57F	B	15S	2001	8.34	7.65	8.62	0.98	3.74	2.45	4.55	>4	2	>4	1	0	0.00	1 on 3
R2	A	14S	1998	15.66	15.24	15.91	0.67	4.00	3.03	5.72	>4	2	>4	0	4	1.57	1
52D	B	15S	2001	15.17	14.62	15.35	0.73	2.10	1.53	2.63	>4	0	>4	0	4	0.13	1
T8	A	4S	1998	20.23	19.81	21.08	1.27	5.78	5.15	6.40	>4	2	>4	0	8	0.34	3
55C	B	15S	2001	18.05	17.67	18.52	0.85	4.28	3.82	4.35	>4	1	>4	3	1	0.04	1 on 3

APPENDIX A

Navigation Log

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
17a	1	9:16:17	11/27/2001	14.8	0.9	13.9	7615023.9	719658.2	45.617751	-122.794739	5	8.3	1.7	5	2
17a	2	9:17:08	11/27/2001	14.7	0.9	13.8	7615023.3	719661.1	45.617759	-122.794742	8	8.3	1.7	5	2
17a	3	9:17:55	11/27/2001	14.8	0.9	13.9	7615025.6	719658.9	45.617753	-122.794733	11	8.3	1.7	5	2
17b	1	9:22:05	11/27/2001	18.7	0.9	17.8	7615331.9	719718.8	45.617941	-122.793543	14	8.6	1.4	6	2
17b	2	9:22:48	11/27/2001	18.7	0.9	17.8	7615328.8	719719.9	45.617943	-122.793555	17	8.3	1.7	5	2
17b	3	9:23:24	11/27/2001	18.7	0.9	17.8	7615326.4	719722.8	45.617951	-122.793565	20	8.3	1.7	5	2
17c	1	9:28:27	11/27/2001	47.6	0.9	46.7	7615971.9	719843.4	45.618332	-122.791056	23	8.6	1.4	6	2
17c	2	9:29:13	11/27/2001	47.4	0.9	46.5	7615972.3	719850.4	45.618351	-122.791055	26	8.4	1.6	5	2
17c	3	9:29:59	11/27/2001	47.7	0.9	46.8	7615974.7	719843.6	45.618333	-122.791045	29	8.7	1.3	6	2
17d	1	9:35:18	11/27/2001	50.1	0.8	49.3	7616605.7	719996.3	45.618801	-122.788597	32	9.0	1.0	9	2
17d	2	9:36:07	11/27/2001	50.0	0.8	49.2	7616609.0	719990.0	45.618783	-122.788584	35	8.8	1.2	8	2
17d	3	9:37:17	11/27/2001	50.2	0.8	49.4	7616605.6	719991.5	45.618787	-122.788597	38	8.8	1.2	8	2
17e	1	9:46:14	11/27/2001	14.0	0.8	13.2	7616897.5	720048.0	45.618965	-122.787463	41	8.4	1.6	6	2
17e	2	9:48:21	11/27/2001	15.6	0.8	14.8	7616889.4	720053.2	45.618979	-122.787495	47	8.4	1.6	6	2
17e	3	9:48:47	11/27/2001	14.4	0.8	13.6	7616892.6	720057.2	45.618990	-122.787483	50	8.4	1.6	6	2
18f	1	10:00:26	11/27/2001	4.8	0.8	4.0	7617048.9	719416.3	45.617245	-122.786802	53	8.5	1.5	6	2
18f	2	10:01:11	11/27/2001	4.8	0.8	4.0	7617050.1	719415.2	45.617242	-122.786797	56	8.8	1.2	7	2
18f	3	10:02:00	11/27/2001	4.7	0.8	3.9	7617052.4	719411.7	45.617233	-122.786787	59	8.5	1.5	6	2
18e	1	10:07:09	11/27/2001	44.6	0.8	43.8	7616892.0	719386.8	45.617152	-122.787411	62	8.8	1.2	7	2
18e	2	10:08:02	11/27/2001	43.5	0.8	42.7	7616898.8	719384.9	45.617147	-122.787384	65	8.8	1.2	7	2
18e	3	10:08:54	11/27/2001	42.8	0.8	42.0	7616899.5	719381.7	45.617138	-122.787381	68	9.0	1.0	8	2
18d	1	10:14:33	11/27/2001	49.9	0.7	49.2	7616466.0	719304.7	45.616894	-122.789066	71	8.9	1.1	8	2
18d	2	10:15:23	11/27/2001	49.8	0.7	49.1	7616462.2	719310.7	45.616910	-122.789082	74	9.0	1.0	8	2
18d	3	10:16:40	11/27/2001	50.0	0.7	49.3	7616454.8	719306.5	45.616898	-122.789110	77	8.9	1.1	8	2
18c	1	10:23:15	11/27/2001	45.7	0.7	45.0	7616057.6	719217.1	45.616622	-122.790652	80	8.9	1.1	8	2
18c	2	10:24:19	11/27/2001	45.6	0.7	44.9	7616051.6	719215.5	45.616617	-122.790675	83	8.9	1.1	8	2
18c	3	10:25:03	11/27/2001	45.7	0.7	45.0	7616051.8	719223.4	45.616639	-122.790675	86	8.9	1.1	8	2
18b	1	10:29:01	11/27/2001	26.2	0.7	25.5	7615529.0	719094.7	45.616245	-122.792704	89	8.9	1.1	8	2
18b	2	10:30:02	11/27/2001	26.4	0.7	25.7	7615522.6	719090.1	45.616232	-122.792728	92	8.9	1.1	8	2
18b	3	10:30:52	11/27/2001	26.0	0.7	25.3	7615520.3	719100.3	45.616260	-122.792738	95	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
18a	1	10:34:39	11/27/2001	15.2	0.7	14.5	7615339.4	719075.8	45.616179	-122.793442	98	8.9	1.1	8	2
18a	2	10:35:36	11/27/2001	15.0	0.7	14.3	7615336.4	719079.3	45.616188	-122.793454	101	8.9	1.1	8	2
18a	3	10:36:27	11/27/2001	15.7	0.7	15.0	7615347.4	719078.8	45.616188	-122.793411	104	8.9	1.1	8	2
19b	1	10:44:29	11/27/2001	23.1	0.7	22.4	7615694.7	718440.6	45.614465	-122.791984	107	8.9	1.1	8	2
19b	2	10:45:15	11/27/2001	21.9	0.7	21.2	7615688.1	718446.4	45.614480	-122.792010	110	9.1	0.9	9	2
19b	3	10:46:08	11/27/2001	21.1	0.7	20.4	7615686.3	718446.9	45.614481	-122.792017	113	9.0	1.0	8	2
19a	1	10:49:14	11/27/2001	3.5	0.7	2.8	7615574.3	718413.6	45.614382	-122.792451	116	8.5	1.5	7	2
19a	2	10:50:01	11/27/2001	3.4	0.7	2.7	7615574.6	718415.4	45.614386	-122.792450	119	9.1	0.9	9	2
19a	3	10:50:46	11/27/2001	3.3	0.7	2.6	7615574.0	718414.1	45.614383	-122.792452	122	8.6	1.4	7	2
19c	1	10:56:50	11/27/2001	48.3	0.6	47.7	7616493.4	718610.1	45.614992	-122.788883	125	9.0	1.0	8	2
19c	2	10:57:40	11/27/2001	48.3	0.6	47.7	7616495.4	718614.9	45.615005	-122.788875	128	8.6	1.4	7	2
19c	3	10:58:21	11/27/2001	48.4	0.6	47.8	7616504.3	718599.2	45.614963	-122.788839	131	8.6	1.4	7	2
19d	1	11:02:05	11/27/2001	46.1	0.6	45.5	7616916.5	718696.3	45.615261	-122.787239	134	9.1	0.9	9	2
19d	2	11:02:50	11/27/2001	46.1	0.6	45.5	7616918.0	718697.2	45.615263	-122.787233	137	8.7	1.3	8	2
19d	3	11:03:40	11/27/2001	46.2	0.6	45.6	7616920.9	718676.8	45.615208	-122.787220	140	8.7	1.3	8	2
19e	1	11:08:28	11/27/2001	10.0	0.6	9.4	7617174.6	718734.0	45.615384	-122.786235	143	8.7	1.3	8	2
19e	2	11:09:16	11/27/2001	8.8	0.6	8.2	7617174.6	718734.9	45.615387	-122.786235	146	9.1	0.9	9	2
19e	3	11:10:14	11/27/2001	9.4	0.6	8.8	7617173.2	718734.4	45.615385	-122.786241	149	8.8	1.2	8	2
20e	1	11:17:33	11/27/2001	10.6	0.6	10.0	7617447.1	718129.3	45.613748	-122.785104	152	9.1	0.9	9	2
20e	2	11:18:23	11/27/2001	10.3	0.6	9.7	7617444.2	718131.9	45.613754	-122.785115	155	8.8	1.2	8	2
20e	3	11:19:04	11/27/2001	10.6	0.6	10.0	7617442.0	718132.2	45.613755	-122.785124	158	9.1	0.9	9	2
20d	1	11:22:33	11/27/2001	30.9	0.6	30.3	7617332.9	718102.3	45.613665	-122.785547	161	9.1	0.9	9	2
20d	2	11:23:16	11/27/2001	31.1	0.6	30.5	7617330.8	718102.9	45.613666	-122.785555	164	9.1	0.9	9	2
20d	3	11:24:10	11/27/2001	31.4	0.6	30.8	7617334.0	718095.8	45.613647	-122.785542	167	9.1	0.9	9	2
20c	1	11:29:11	11/27/2001	54.5	0.6	53.9	7616771.3	717975.4	45.613273	-122.787727	170	9.1	0.9	9	2
20c	2	11:29:57	11/27/2001	54.5	0.6	53.9	7616769.1	717979.8	45.613285	-122.787736	173	8.8	1.2	8	2
20c	3	11:30:38	11/27/2001	54.6	0.6	54.0	7616767.6	717983.3	45.613294	-122.787742	176	8.8	1.2	8	2
20a	1	11:36:30	11/27/2001	35.3	0.6	34.7	7615948.7	717802.1	45.612734	-122.790921	179	8.7	1.3	7	2
20a	2	11:37:19	11/27/2001	35.3	0.6	34.7	7615951.0	717803.8	45.612739	-122.790912	182	8.7	1.3	7	2
20a	3	11:38:07	11/27/2001	35.3	0.6	34.7	7615951.5	717803.2	45.612737	-122.790910	185	8.8	1.2	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
20b	1	11:42:00	11/27/2001	46.9	0.6	46.3	7616350.4	717889.9	45.613006	-122.789361	188	9.1	0.9	9	2
20b	2	11:43:04	11/27/2001	46.9	0.6	46.3	7616352.1	717892.7	45.613014	-122.789355	191	9.1	0.9	9	2
20b	3	11:43:52	11/27/2001	46.9	0.6	46.3	7616350.8	717894.4	45.613018	-122.789360	196	9.1	0.9	9	2
21a	1	11:53:08	11/27/2001	9.9	0.6	9.3	7616111.7	717175.0	45.611028	-122.790215	197	9.1	0.9	9	2
21a	2	11:53:54	11/27/2001	9.9	0.6	9.3	7616109.8	717180.1	45.611041	-122.790222	202	9.1	0.9	9	2
21a	3	11:54:38	11/27/2001	10.7	0.6	10.1	7616116.1	717173.7	45.611024	-122.790197	203	9.1	0.9	9	2
21b	1	11:58:10	11/27/2001	35.8	0.6	35.2	7616225.7	717206.8	45.611124	-122.789773	208	9.0	1.0	9	2
21b	2	11:58:52	11/27/2001	34.6	0.6	34.0	7616223.2	717205.6	45.611120	-122.789783	209	9.0	1.0	9	2
21b	3	12:00:53	11/27/2001	34.8	0.6	34.2	7616228.3	717199.4	45.611104	-122.789762	215	9.0	1.0	9	2
21c	1	12:04:33	11/27/2001	51.5	0.6	50.9	7616916.5	717356.6	45.611588	-122.787091	220	9.0	1.0	9	2
21c	2	12:05:18	11/27/2001	51.4	0.6	50.8	7616912.3	717359.7	45.611596	-122.787108	221	9.0	1.0	9	2
21c	3	12:06:07	11/27/2001	51.4	0.6	50.8	7616913.0	717360.3	45.611598	-122.787105	226	9.0	1.0	9	2
21d	1	12:09:59	11/27/2001	53.8	0.6	53.2	7617474.1	717458.1	45.611909	-122.784924	227	8.1	1.9	6	2
21d	2	12:10:50	11/27/2001	49.9	0.6	49.3	7617473.6	717451.7	45.611892	-122.784925	232	8.7	1.3	7	2
21d	3	12:11:41	11/27/2001	49.1	0.6	48.5	7617473.8	717452.5	45.611894	-122.784924	233	8.7	1.3	7	2
21e	1	12:18:53	11/27/2001	20.3	0.6	19.7	7617661.5	717504.5	45.612051	-122.784197	237	8.9	1.1	8	2
21e	2	12:19:40	11/27/2001	21.3	0.6	20.7	7617663.6	717497.9	45.612033	-122.784188	238	8.9	1.1	8	2
21e	3	12:20:23	11/27/2001	22.0	0.6	21.4	7617662.7	717493.1	45.612020	-122.784191	243	8.9	1.1	8	2
21f	1	12:23:39	11/27/2001	10.4	0.6	9.8	7617750.8	717516.2	45.612090	-122.783850	244	8.9	1.1	8	2
21f	2	12:24:12	11/27/2001	10.4	0.6	9.8	7617750.2	717518.2	45.612096	-122.783852	249	8.9	1.1	8	2
21f	3	12:25:03	11/27/2001	10.6	0.6	10.0	7617751.5	717514.7	45.612086	-122.783847	250	8.9	1.1	8	2
22h	1	13:37:57	11/27/2001	18.6	1.2	17.4	7619616.9	717218.1	45.611417	-122.776527	254	8.9	1.1	8	2
22h	2	13:38:45	11/27/2001	18.3	1.2	17.1	7619625.6	717216.1	45.611413	-122.776493	255	8.7	1.3	7	2
22h	3	13:39:46	11/27/2001	18.6	1.2	17.4	7619619.1	717214.8	45.611408	-122.776518	260	8.7	1.3	7	2
22f	1	13:44:54	11/27/2001	38.0	1.3	36.7	7619065.9	717100.2	45.611052	-122.778667	261	8.9	1.1	8	2
22f	2	13:45:38	11/27/2001	37.7	1.3	36.4	7619065.8	717101.6	45.611055	-122.778667	266	9.0	1.0	9	2
22f	3	13:46:22	11/27/2001	38.2	1.3	36.9	7619071.0	717108.1	45.611074	-122.778647	267	8.9	1.1	8	2
22e	1	13:51:04	11/27/2001	9.3	1.4	7.9	7618471.1	717319.3	45.611606	-122.781014	270	8.5	1.5	7	2
22e	2	13:52:50	11/27/2001	8.9	1.4	7.5	7618468.2	717315.1	45.611594	-122.781025	275	9.0	1.0	8	2
22e	3	13:53:48	11/27/2001	10.4	1.4	9.0	7618475.0	717312.0	45.611586	-122.780998	276	9.0	1.0	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
22d	1	14:00:09	11/27/2001	19.9	1.5	18.4	7617936.1	716872.3	45.610339	-122.783055	281	8.8	1.2	7	2
22d	2	14:02:00	11/27/2001	21.6	1.5	20.1	7617920.2	716869.0	45.610329	-122.783116	282	8.5	1.5	7	2
22d	3	14:03:28	11/27/2001	23.7	1.5	22.2	7617929.0	716875.8	45.610348	-122.783083	287	9.0	1.0	9	2
22c	1	14:07:52	11/27/2001	55.0	1.5	53.5	7617385.5	716772.1	45.610022	-122.785194	288	8.9	1.1	8	2
22c	2	14:08:35	11/27/2001	55.1	1.6	53.5	7617385.6	716778.0	45.610038	-122.785195	293	8.7	1.3	7	2
22c	3	14:09:25	11/27/2001	55.2	1.6	53.6	7617379.8	716772.5	45.610023	-122.785217	294	8.7	1.3	7	2
22b	1	14:14:06	11/27/2001	45.3	1.6	43.7	7616614.9	716619.0	45.609542	-122.788187	299	8.8	1.2	8	2
22b	2	14:14:48	11/27/2001	45.5	1.6	43.9	7616621.4	716618.0	45.609540	-122.788162	300	8.7	1.3	7	2
22b	3	14:15:34	11/27/2001	45.4	1.6	43.8	7616617.1	716623.5	45.609555	-122.788179	305	8.7	1.3	7	2
22a	1	14:19:26	11/27/2001	12.4	1.7	10.7	7616449.2	716381.4	45.608878	-122.788808	306	8.7	1.3	7	2
22a	2	14:20:17	11/27/2001	11.7	1.7	10.0	7616445.4	716385.5	45.608889	-122.788824	311	8.7	1.3	7	2
22a	3	14:20:59	11/27/2001	11.9	1.7	10.2	7616448.1	716384.0	45.608885	-122.788813	312	8.7	1.3	7	2
23a	1	14:29:24	11/27/2001	13.6	1.8	11.8	7616656.7	715909.9	45.607602	-122.787946	317	8.7	1.3	7	2
23a	2	14:30:12	11/27/2001	11.6	1.8	9.8	7616655.7	715913.8	45.607612	-122.787950	318	8.7	1.3	7	2
23a	3	14:31:01	11/27/2001	11.6	1.8	9.8	7616654.0	715915.1	45.607616	-122.787957	323	8.7	1.3	7	2
23b	1	14:35:15	11/27/2001	39.0	1.9	37.1	7616744.9	715945.5	45.607706	-122.787605	324	8.7	1.3	7	2
23b	2	14:36:06	11/27/2001	38.7	1.9	36.8	7616738.3	715941.3	45.607694	-122.787631	329	8.7	1.3	7	2
23b	3	14:36:51	11/27/2001	38.7	1.9	36.8	7616736.8	715944.3	45.607702	-122.787636	330	8.7	1.3	7	2
23c	1	14:43:24	11/27/2001	48.7	2.0	46.7	7617347.6	716139.4	45.608284	-122.785272	335	8.7	1.3	7	2
23c	2	14:44:26	11/27/2001	48.8	2.0	46.8	7617348.6	716128.3	45.608254	-122.785267	336	8.7	1.3	7	2
23c	3	14:44:59	11/27/2001	48.6	2.0	46.6	7617346.6	716135.1	45.608273	-122.785276	340	8.7	1.3	7	2
23d	1	14:48:31	11/27/2001	44.3	2.0	42.3	7617983.4	716327.2	45.608849	-122.782810	341	8.7	1.3	7	2
23d	2	14:49:14	11/27/2001	41.1	2.0	39.1	7617982.2	716326.0	45.608845	-122.782814	346	8.7	1.3	7	2
23d	3	14:49:56	11/27/2001	40.9	2.0	38.9	7617988.1	716321.4	45.608833	-122.782791	347	8.7	1.3	7	2
23e	1	14:55:05	11/27/2001	14.0	2.1	11.9	7618187.1	716353.4	45.608936	-122.782017	351	8.7	1.3	7	2
23e	2	14:55:52	11/27/2001	11.2	2.1	9.1	7618187.6	716354.9	45.608940	-122.782015	352	8.9	1.1	8	2
23e	3	14:56:36	11/27/2001	10.6	2.1	8.5	7618187.9	716353.1	45.608935	-122.782014	357	8.7	1.3	7	2
24e	1	15:05:37	11/27/2001	27.9	2.2	25.7	7618303.0	715889.9	45.607675	-122.781513	358	8.6	1.4	6	2
24e	2	15:06:25	11/27/2001	29.3	2.2	27.1	7618300.9	715892.3	45.607681	-122.781521	363	8.7	1.3	7	2
24e	3	15:07:27	11/27/2001	32.4	2.2	30.2	7618298.3	715894.9	45.607688	-122.781532	364	8.5	1.5	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
24d	1	15:13:51	11/27/2001	58.8	2.2	56.6	7617804.0	715670.1	45.607033	-122.783438	369	8.8	1.2	7	2
24d	2	15:14:38	11/27/2001	58.8	2.2	56.6	7617801.0	715671.7	45.607038	-122.783450	370	8.8	1.2	7	2
24d	3	15:15:24	11/27/2001	59.0	2.2	56.8	7617802.0	715669.7	45.607032	-122.783446	375	8.8	1.2	7	2
24c	1	15:20:18	11/27/2001	48.6	2.3	46.3	7617256.0	715417.0	45.606297	-122.785550	376	8.6	1.4	6	2
24c	2	15:21:11	11/27/2001	48.7	2.3	46.4	7617249.6	715421.6	45.606309	-122.785576	381	8.6	1.4	6	2
24c	3	15:21:51	11/27/2001	48.6	2.3	46.3	7617251.2	715421.4	45.606309	-122.785570	382	8.6	1.4	6	2
24b	1	15:27:08	11/27/2001	35.9	2.3	33.6	7616966.3	715302.7	45.605961	-122.786669	386	8.9	1.1	7	2
24b	2	15:27:55	11/27/2001	35.9	2.3	33.6	7616962.3	715303.3	45.605963	-122.786685	387	8.9	1.1	7	2
24b	3	15:28:38	11/27/2001	35.6	2.3	33.3	7616960.2	715304.9	45.605967	-122.786693	392	8.9	1.1	7	2
24a	1	15:31:56	11/27/2001	10.4	2.3	8.1	7616880.1	715271.3	45.605868	-122.787003	393	8.9	1.1	7	2
24a	2	15:32:43	11/27/2001	10.6	2.3	8.3	7616880.0	715269.8	45.605864	-122.787003	398	8.9	1.1	7	2
24a	3	15:33:53	11/27/2001	10.2	2.3	7.9	7616873.0	715270.4	45.605865	-122.787030	399	8.8	1.2	7	2
25a	1	15:39:03	11/27/2001	39.1	2.3	36.8	7617220.3	714677.6	45.604267	-122.785608	404	9.1	0.9	8	2
25a	2	15:39:44	11/27/2001	39.1	2.3	36.8	7617220.3	714679.0	45.604271	-122.785608	405	9.1	0.9	8	2
25a	3	15:40:30	11/27/2001	39.2	2.3	36.9	7617215.5	714680.6	45.604275	-122.785627	410	9.1	0.9	8	2
25b	1	15:44:48	11/27/2001	59.2	2.3	56.9	7617892.5	714968.8	45.605117	-122.783015	411	9.1	0.9	8	2
25b	2	15:45:39	11/27/2001	59.1	2.3	56.8	7617892.6	714970.6	45.605122	-122.783015	415	9.1	0.9	8	2
25b	3	15:46:15	11/27/2001	59.2	2.3	56.9	7617887.6	714973.1	45.605129	-122.783035	416	9.1	0.9	8	2
25c	1	15:51:24	11/27/2001	53.1	2.3	50.8	7618481.7	715246.0	45.605923	-122.780744	419	9.0	1.0	6	2
25c	2	15:52:17	11/27/2001	52.4	2.3	50.1	7618481.4	715240.3	45.605907	-122.780745	424	8.9	1.1	5	2
25c	3	15:52:55	11/27/2001	52.5	2.3	50.2	7618476.7	715246.3	45.605923	-122.780763	425	8.9	1.1	5	2
25d	1	15:57:12	11/27/2001	12.8	2.3	10.5	7618629.8	715311.5	45.606114	-122.780173	430	8.9	1.1	7	2
25d	2	15:57:52	11/27/2001	13.0	2.3	10.7	7618629.0	715313.2	45.606119	-122.780176	431	8.9	1.1	7	2
25d	3	15:58:32	11/27/2001	12.1	2.3	9.8	7618635.9	715311.0	45.606113	-122.780149	436	8.9	1.1	7	2
26e	1	16:03:15	11/27/2001	43.4	2.3	41.1	7618779.3	714696.3	45.604439	-122.779521	437	8.7	1.3	7	2
26e	2	16:04:10	11/27/2001	42.6	2.3	40.3	7618782.0	714699.6	45.604448	-122.779511	442	8.9	1.1	8	2
26e	3	16:04:55	11/27/2001	41.9	2.3	39.6	7618784.7	714693.3	45.604431	-122.779500	443	8.9	1.1	8	2
26d	1	16:08:48	11/27/2001	59.4	2.3	57.1	7618307.2	714488.3	45.603832	-122.781342	448	8.8	1.2	7	2
26d	2	16:09:33	11/27/2001	59.9	2.3	57.6	7618309.9	714479.1	45.603807	-122.781330	449	8.8	1.2	7	2
26d	3	16:10:13	11/27/2001	59.5	2.3	57.2	7618307.7	714485.2	45.603824	-122.781340	454	8.8	1.2	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
26c	1	16:14:29	11/27/2001	50.5	2.3	48.2	7617794.3	714237.8	45.603106	-122.783318	455	8.8	1.2	7	2
26c	2	16:15:12	11/27/2001	51.2	2.3	48.9	7617793.4	714234.6	45.603097	-122.783321	461	8.8	1.2	7	2
26c	3	16:15:50	11/27/2001	50.8	2.3	48.5	7617793.3	714232.4	45.603091	-122.783321	462	9.1	0.9	8	2
26b	1	16:19:05	11/27/2001	22.0	2.3	19.7	7617476.2	714100.5	45.602705	-122.784545	466	8.8	1.2	7	2
26b	2	16:20:15	11/27/2001	22.4	2.3	20.1	7617479.7	714103.0	45.602712	-122.784532	468	8.5	1.5	6	2
26b	3	16:21:07	11/27/2001	24.6	2.3	22.3	7617487.0	714097.2	45.602697	-122.784502	473	8.5	1.5	6	2
26a	1	16:25:30	11/27/2001	6.7	2.3	4.4	7617415.4	714063.3	45.602598	-122.784778	474	8.4	1.6	6	2
26a	2	16:26:10	11/27/2001	6.8	2.3	4.5	7617420.3	714055.9	45.602578	-122.784758	479	8.2	1.8	5	2
26a	3	16:26:54	11/27/2001	6.7	2.3	4.4	7617416.5	714058.1	45.602584	-122.784773	480	8.8	1.2	7	2
27a	1	16:39:31	11/27/2001	10.4	2.3	8.1	7617713.3	713479.0	45.601019	-122.783550	484	8.9	1.1	8	2
27a	2	16:40:16	11/27/2001	9.7	2.3	7.4	7617713.7	713477.0	45.601014	-122.783548	485	8.9	1.1	8	2
27a	3	16:41:04	11/27/2001	9.4	2.3	7.1	7617711.3	713481.7	45.601026	-122.783558	490	8.9	1.1	8	2
27b	1	16:45:14	11/27/2001	30.8	2.3	28.5	7617771.4	713510.0	45.601109	-122.783327	491	8.9	1.1	8	2
27b	2	16:46:03	11/27/2001	31.7	2.3	29.4	7617785.0	713508.5	45.601106	-122.783273	495	8.9	1.1	8	2
27b	3	16:46:45	11/27/2001	31.8	2.3	29.5	7617782.5	713511.7	45.601114	-122.783284	496	8.9	1.1	8	2
27c	1	16:55:44	11/27/2001	66.7	2.3	64.4	7618335.6	713769.0	45.601862	-122.781152	500	8.8	1.2	7	2
27c	2	16:56:38	11/27/2001	66.3	2.3	64.0	7618340.5	713776.8	45.601884	-122.781134	501	8.8	1.2	7	2
27c	3	16:57:29	11/27/2001	66.9	2.3	64.6	7618347.7	713774.9	45.601880	-122.781105	509	8.7	1.3	6	2
27d	1	17:02:47	11/27/2001	72.1	2.2	69.9	7618722.9	713944.4	45.602373	-122.779658	510	8.7	1.3	6	2
27d	2	17:03:29	11/27/2001	72.3	2.2	70.1	7618726.1	713938.4	45.602357	-122.779645	514	8.7	1.3	6	2
27d	3	17:04:10	11/27/2001	72.3	2.2	70.1	7618722.9	713942.3	45.602368	-122.779658	515	8.7	1.3	6	2
27e	1	17:08:40	11/27/2001	36.1	2.2	33.9	7618990.3	714051.2	45.602687	-122.778626	519	8.7	1.3	6	2
27e	2	17:09:26	11/27/2001	36.0	2.2	33.8	7618986.2	714054.7	45.602696	-122.778642	520	8.7	1.3	6	2
27e	3	17:10:05	11/27/2001	36.3	2.2	34.1	7618983.2	714048.6	45.602679	-122.778653	525	8.7	1.3	6	2
27f	1	8:58:00	11/28/2001	29.3	1.2	28.1	7619067.3	714085.7	45.602787	-122.778329	530	8.8	1.2	7	2
27f	2	8:58:48	11/28/2001	29.4	1.2	28.2	7619066.7	714088.6	45.602795	-122.778331	535	8.8	1.2	7	2
27f	3	8:59:26	11/28/2001	28.6	1.2	27.4	7619064.0	714093.2	45.602808	-122.778343	536	8.8	1.2	7	2
27g	1	9:04:52	11/28/2001	39.1	1.2	37.9	7619336.5	714448.0	45.603802	-122.777317	541	9.0	1.0	8	2
27g	2	9:05:35	11/28/2001	39.1	1.2	37.9	7619336.4	714450.4	45.603808	-122.777318	542	8.9	1.1	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
27g	3	9:06:24	11/28/2001	39.3	1.2	38.1	7619340.6	714450.3	45.603808	-122.777302	547	9.0	1.0	8	2
27h	1	9:13:14	11/28/2001	40.1	1.1	39.0	7619702.9	714611.0	45.604277	-122.775904	548	8.3	1.7	5	2
27h	2	9:14:03	11/28/2001	40.3	1.1	39.2	7619707.8	714606.0	45.604263	-122.775885	553	8.3	1.7	5	2
27h	3	9:14:43	11/28/2001	40.3	1.1	39.2	7619705.2	714605.7	45.604262	-122.775895	554	8.3	1.7	5	2
27i	1	9:19:08	11/28/2001	40.1	1.1	39.0	7620126.2	714511.2	45.604036	-122.774240	559	8.3	1.7	5	2
27i	2	9:19:50	11/28/2001	40.2	1.1	39.1	7620122.5	714509.5	45.604031	-122.774254	560	8.3	1.7	5	2
27i	3	9:20:31	11/28/2001	40.2	1.1	39.1	7620128.6	714506.7	45.604023	-122.774230	565	8.4	1.6	5	2
28f	1	9:32:26	11/28/2001	14.4	1.1	13.3	7619628.4	713675.8	45.601707	-122.776092	567	8.9	1.1	7	2
28f	2	9:33:07	11/28/2001	14.4	1.1	13.3	7619628.6	713677.3	45.601711	-122.776092	572	9.0	1.0	8	2
28f	3	9:33:47	11/28/2001	14.3	1.1	13.2	7619627.7	713669.6	45.601690	-122.776094	573	9.0	1.0	8	2
28e	1	9:38:49	11/28/2001	45.0	1.0	44.0	7619357.4	713523.6	45.601269	-122.777134	578	7.1	2.9	5	2
28e	2	9:39:30	11/28/2001	45.1	1.0	44.1	7619359.3	713525.0	45.601273	-122.777127	579	8.4	1.6	5	2
28e	3	9:40:11	11/28/2001	45.0	1.0	44.0	7619356.7	713525.0	45.601273	-122.777137	584	8.7	1.3	7	2
28d	1	9:46:54	11/28/2001	78.9	1.0	77.9	7618854.5	713306.4	45.600634	-122.779074	585	8.7	1.3	7	2
28d	2	9:48:06	11/28/2001	79.1	1.0	78.1	7618872.6	713319.8	45.600673	-122.779005	590	8.4	1.6	6	2
28d	3	9:48:53	11/28/2001	78.6	1.0	77.6	7618867.0	713310.8	45.600648	-122.779026	591	9.0	1.0	8	2
28c	1	9:55:47	11/28/2001	60.5	1.0	59.5	7618370.5	713075.3	45.599964	-122.780939	596	9.0	1.0	8	2
28c	2	9:56:34	11/28/2001	60.9	1.0	59.9	7618371.5	713072.7	45.599956	-122.780935	597	9.0	1.0	8	2
28c	3	9:57:19	11/28/2001	60.5	1.0	59.5	7618370.1	713078.0	45.599971	-122.780941	602	9.0	1.0	8	2
28b	1	10:02:31	11/28/2001	36.5	1.0	35.5	7618116.6	712939.0	45.599570	-122.781916	603	8.8	1.2	7	2
28b	2	10:02:55	11/28/2001	36.3	1.0	35.3	7618113.8	712941.4	45.599577	-122.781927	608	8.8	1.2	7	2
28b	3	10:03:39	11/28/2001	36.4	0.9	35.5	7618111.5	712945.4	45.599587	-122.781936	609	8.8	1.2	7	2
28a	1	10:12:17	11/28/2001	12.5	0.9	11.6	7617934.3	713038.4	45.599829	-122.782638	614	8.9	1.1	8	2
28a	2	10:13:02	11/28/2001	11.9	0.9	11.0	7617931.3	713036.2	45.599822	-122.782650	615	8.9	1.1	8	2
28a	3	10:13:47	11/28/2001	10.0	0.9	9.1	7617924.2	713036.2	45.599822	-122.782677	620	8.7	1.3	7	2
29a	1	10:23:11	11/28/2001	12.8	0.9	11.9	7618291.7	712275.0	45.597763	-122.781159	621	8.9	1.1	8	2
29a	2	10:24:07	11/28/2001	12.8	0.9	11.9	7618288.1	712273.6	45.597759	-122.781172	626	8.9	1.1	8	2
29a	3	10:24:43	11/28/2001	12.9	0.9	12.0	7618289.3	712272.4	45.597756	-122.781168	627	8.9	1.1	8	2
29b	1	10:28:46	11/28/2001	20.9	0.9	20.0	7618349.5	712292.6	45.597816	-122.780935	630	8.9	1.1	8	2
29b	2	10:29:39	11/28/2001	20.6	0.9	19.7	7618352.1	712293.5	45.597819	-122.780924	635	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
29b	3	10:30:54	11/28/2001	22.5	0.9	21.6	7618349.0	712314.0	45.597875	-122.780939	636	8.9	1.1	8	2
29c	1	10:39:08	11/28/2001	74.5	0.8	73.7	7618893.5	712637.4	45.598803	-122.778848	641	8.9	1.1	8	2
29c	2	10:40:03	11/28/2001	73.9	0.8	73.1	7618877.2	712635.8	45.598798	-122.778912	642	8.9	1.1	8	2
29c	3	10:41:04	11/28/2001	74.6	0.8	73.8	7618884.9	712649.7	45.598837	-122.778883	647	8.9	1.1	8	2
29d	1	10:58:31	11/28/2001	59.0	0.8	58.2	7619408.3	712929.4	45.599644	-122.776870	648	9.1	0.9	9	2
29d	2	10:59:26	11/28/2001	58.9	0.8	58.1	7619403.4	712944.0	45.599684	-122.776890	653	8.7	1.3	8	2
29d	3	11:00:11	11/28/2001	59.0	0.8	58.2	7619392.7	712932.4	45.599651	-122.776931	654	9.1	0.9	9	2
29e	1	11:08:14	11/28/2001	28.7	0.8	27.9	7619591.3	713036.7	45.599952	-122.776167	659	9.1	0.9	9	2
29e	2	11:08:59	11/28/2001	28.3	0.8	27.5	7619594.7	713030.4	45.599935	-122.776153	660	9.1	0.9	9	2
29e	3	11:09:45	11/28/2001	28.1	0.8	27.3	7619598.9	713025.1	45.599921	-122.776136	665	9.1	0.9	9	2
29f	1	11:13:52	11/28/2001	43.5	0.7	42.8	7619827.2	713180.3	45.600364	-122.775262	666	9.1	0.9	9	2
29f	2	11:14:49	11/28/2001	43.4	0.7	42.7	7619823.6	713175.0	45.600349	-122.775275	671	9.1	0.9	9	2
29f	3	11:15:40	11/28/2001	43.6	0.7	42.9	7619838.3	713175.4	45.600351	-122.775217	672	9.1	0.9	9	2
29g	1	11:20:29	11/28/2001	51.9	0.7	51.2	7620208.9	713392.8	45.600976	-122.773794	677	8.9	1.1	8	2
29g	2	11:21:39	11/28/2001	52.2	0.7	51.5	7620204.0	713393.1	45.600976	-122.773813	678	8.9	1.1	8	2
29g	3	11:22:23	11/28/2001	52.9	0.7	52.2	7620201.2	713384.6	45.600953	-122.773823	683	8.9	1.1	8	2
30e	1	11:32:59	11/28/2001	41.9	0.7	41.2	7619828.0	712405.4	45.598240	-122.775173	684	8.9	1.1	8	2
30e	2	11:34:58	11/28/2001	42.2	0.7	41.5	7619805.0	712393.2	45.598205	-122.775261	689	9.1	0.9	9	2
30e	3	11:35:39	11/28/2001	41.7	0.7	41.0	7619807.8	712383.4	45.598178	-122.775250	690	9.1	0.9	9	2
30d	1	11:41:45	11/28/2001	78.8	0.7	78.1	7619341.4	712147.3	45.597495	-122.777045	695	9.1	0.9	9	2
30d	2	11:42:51	11/28/2001	78.7	0.7	78.0	7619358.4	712145.1	45.597490	-122.776978	696	9.1	0.9	9	2
30d	3	11:43:36	11/28/2001	78.6	0.7	77.9	7619363.7	712159.0	45.597528	-122.776959	701	9.1	0.9	9	2
30c	1	11:50:31	11/28/2001	52.8	0.7	52.1	7619026.3	711931.2	45.596878	-122.778252	702	9.1	0.9	9	2
30c	2	11:51:19	11/28/2001	53.2	0.7	52.5	7619028.1	711921.6	45.596852	-122.778244	707	9.0	1.0	9	2
30c	3	11:53:02	11/28/2001	53.3	0.7	52.6	7619038.6	711922.9	45.596856	-122.778203	708	9.0	1.0	9	2
30b	1	11:59:43	11/28/2001	34.8	0.7	34.1	7618721.4	711733.7	45.596313	-122.779421	713	9.0	1.0	9	2
30b	2	12:00:28	11/28/2001	34.6	0.7	33.9	7618713.6	711732.4	45.596309	-122.779451	714	9.0	1.0	9	2
30b	3	12:01:14	11/28/2001	34.9	0.7	34.2	7618722.6	711728.5	45.596298	-122.779415	719	9.0	1.0	9	2
30a	1	12:04:26	11/28/2001	12.9	0.7	12.2	7618638.9	711677.3	45.596152	-122.779737	720	9.0	1.0	9	2
30a	2	12:05:12	11/28/2001	13.5	0.7	12.8	7618635.6	711683.0	45.596167	-122.779750	725	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
30a	3	12:05:52	11/28/2001	12.9	0.7	12.2	7618631.6	711684.6	45.596171	-122.779766	726	8.9	1.1	8	2
31a	1	12:59:06	11/28/2001	33.9	0.6	33.3	7618973.6	711148.8	45.594729	-122.778372	731	8.4	1.6	8	2
31a	2	12:59:51	11/28/2001	34.1	0.6	33.5	7618973.9	711149.5	45.594731	-122.778370	732	9.0	1.0	9	2
31a	3	13:00:39	11/28/2001	35.9	0.6	35.3	7618975.1	711146.4	45.594722	-122.778365	737	9.0	1.0	9	2
31b	1	13:04:13	11/28/2001	42.2	0.7	41.5	7619027.8	711177.9	45.594813	-122.778163	738	9.0	1.0	8	2
31b	2	13:04:53	11/28/2001	41.9	0.7	41.2	7619028.2	711171.6	45.594795	-122.778161	743	8.7	1.3	7	2
31b	3	13:05:34	11/28/2001	41.4	0.7	40.7	7619030.4	711168.1	45.594786	-122.778152	744	8.7	1.3	7	2
31c	1	13:09:16	11/28/2001	51.6	0.7	50.9	7619285.5	711336.8	45.595268	-122.777174	749	8.9	1.1	8	2
31c	2	13:09:55	11/28/2001	51.6	0.7	50.9	7619284.0	711332.8	45.595257	-122.777180	750	9.1	0.9	9	2
31c	3	13:10:36	11/28/2001	51.8	0.7	51.1	7619282.7	711333.5	45.595259	-122.777185	755	9.1	0.9	9	2
31d	1	13:14:14	11/28/2001	73.8	0.7	73.1	7619772.4	711626.0	45.596099	-122.775304	756	8.9	1.1	7	2
31d	2	13:14:54	11/28/2001	73.9	0.7	73.2	7619772.3	711626.2	45.596099	-122.775305	761	8.0	2.0	6	2
31d	3	13:15:33	11/28/2001	73.7	0.7	73.0	7619771.0	711633.6	45.596119	-122.775311	762	8.7	1.3	7	2
31e	1	13:20:22	11/28/2001	45.0	0.7	44.3	7620127.7	711833.6	45.596695	-122.773940	767	9.0	1.0	8	2
31e	2	13:21:02	11/28/2001	44.9	0.7	44.2	7620128.9	711831.6	45.596690	-122.773935	768	9.0	1.0	8	2
31e	3	13:21:39	11/28/2001	45.1	0.7	44.4	7620131.0	711831.8	45.596690	-122.773927	773	9.0	1.0	8	2
32d	1	13:31:02	11/28/2001	25.2	0.8	24.4	7620436.5	711392.3	45.595509	-122.772685	774	8.2	1.8	8	2
32d	2	13:32:15	11/28/2001	23.8	0.8	23.0	7620441.8	711391.2	45.595507	-122.772664	779	9.0	1.0	8	2
32d	3	13:32:57	11/28/2001	23.3	0.8	22.5	7620439.6	711393.0	45.595511	-122.772673	780	9.0	1.0	9	2
32c	1	13:36:58	11/28/2001	43.1	0.8	42.3	7620308.6	711299.7	45.595245	-122.773174	785	8.7	1.3	7	2
32c	2	13:38:37	11/28/2001	46.5	0.9	45.6	7620310.5	711285.8	45.595207	-122.773166	786	8.9	1.1	8	2
32c	3	13:39:22	11/28/2001	44.6	0.9	43.7	7620315.5	711289.4	45.595218	-122.773146	791	8.9	1.1	8	2
32b	1	13:43:58	11/28/2001	83.0	0.9	82.1	7619857.6	710935.1	45.594211	-122.774896	792	8.9	1.1	8	2
32b	2	13:44:39	11/28/2001	82.9	0.9	82.0	7619851.9	710938.9	45.594221	-122.774918	796	8.9	1.1	8	2
32b	3	13:45:19	11/28/2001	82.9	0.9	82.0	7619852.4	710939.8	45.594224	-122.774917	797	8.9	1.1	8	2
32a	1	13:54:20	11/28/2001	30.1	1.0	29.1	7619177.3	710751.3	45.593655	-122.777532	802	8.8	1.2	8	2
32a	2	13:55:22	11/28/2001	29.9	1.0	28.9	7619181.2	710752.3	45.593658	-122.777517	803	8.8	1.2	8	2
32a	3	13:56:05	11/28/2001	28.2	1.0	27.2	7619176.3	710745.9	45.593640	-122.777536	808	9.0	1.0	9	2
33a	1	14:03:27	11/28/2001	15.5	1.1	14.4	7619680.4	710011.4	45.591665	-122.775486	809	9.0	1.0	8	2
33a	2	14:04:09	11/28/2001	20.6	1.1	19.5	7619683.0	710017.9	45.591683	-122.775477	815	8.5	1.5	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
33a	3	14:05:02	11/28/2001	16.4	1.1	15.3	7619693.6	709994.7	45.591620	-122.775433	816	8.7	1.3	7	2
33b	1	14:09:18	11/28/2001	44.1	1.2	42.9	7619800.2	710058.8	45.591804	-122.775023	821	8.8	1.2	8	2
33b	2	14:10:00	11/28/2001	44.4	1.2	43.2	7619797.9	710060.9	45.591810	-122.775033	822	8.7	1.3	7	2
33b	3	14:10:40	11/28/2001	43.5	1.2	42.3	7619793.6	710057.2	45.591799	-122.775049	827	8.7	1.3	7	2
33c	1	14:14:32	11/28/2001	57.6	1.2	56.4	7620159.1	710337.7	45.592597	-122.773653	828	8.7	1.3	7	2
33c	2	14:15:11	11/28/2001	57.7	1.3	56.4	7620159.2	710345.7	45.592618	-122.773653	833	8.7	1.3	7	2
33c	3	14:15:50	11/28/2001	57.6	1.3	56.3	7620158.4	710341.6	45.592607	-122.773656	834	8.7	1.3	7	2
33d	1	14:21:34	11/28/2001	53.3	1.3	52.0	7620648.9	710706.1	45.593644	-122.771781	839	8.7	1.3	7	2
33d	2	14:22:12	11/28/2001	52.6	1.4	51.2	7620645.9	710713.9	45.593665	-122.771793	840	8.7	1.3	7	2
33d	3	14:23:09	11/28/2001	52.7	1.4	51.3	7620644.5	710705.3	45.593642	-122.771798	845	8.7	1.3	7	2
34d	1	14:32:13	11/28/2001	19.1	1.5	17.6	7621107.6	710217.3	45.592340	-122.769936	846	8.7	1.3	7	2
34d	2	14:32:41	11/28/2001	19.3	1.5	17.8	7621107.0	710217.0	45.592339	-122.769938	850	8.7	1.3	7	2
34d	3	14:33:18	11/28/2001	19.8	1.5	18.3	7621103.7	710218.5	45.592343	-122.769951	851	8.7	1.3	7	2
34c	1	14:40:18	11/28/2001	58.9	1.6	57.3	7620756.1	709949.9	45.591579	-122.771279	855	8.7	1.3	7	2
34c	2	14:40:57	11/28/2001	58.6	1.6	57.0	7620752.8	709964.3	45.591619	-122.771293	856	8.7	1.3	7	2
34c	3	14:41:41	11/28/2001	58.8	1.7	57.1	7620752.6	709964.2	45.591618	-122.771294	857	8.7	1.3	7	2
34b	1	14:50:06	11/28/2001	53.0	1.7	51.3	7620410.5	709700.7	45.590870	-122.772601	861	8.7	1.3	7	2
34b	2	14:50:45	11/28/2001	53.1	1.7	51.4	7620411.0	709706.4	45.590885	-122.772600	862	8.7	1.3	7	2
34b	3	14:51:30	11/28/2001	52.9	1.7	51.2	7620402.9	709697.8	45.590861	-122.772630	867	8.7	1.3	7	2
34a	1	14:57:05	11/28/2001	17.6	1.8	15.8	7620111.6	709467.3	45.590207	-122.773742	868	8.5	1.5	6	2
34a	2	14:58:09	11/28/2001	23.0	1.8	21.2	7620126.4	709455.1	45.590174	-122.773683	872	8.5	1.5	6	2
34a	3	14:58:51	11/28/2001	21.7	1.8	19.9	7620121.9	709461.7	45.590192	-122.773702	873	8.5	1.5	6	2
35a	1	15:05:00	11/28/2001	25.8	1.9	23.9	7620499.7	708970.6	45.588875	-122.772173	878	8.5	1.5	6	2
35a	2	15:05:38	11/28/2001	26.2	1.9	24.3	7620498.6	708970.0	45.588873	-122.772177	879	8.7	1.3	7	2
35a	3	15:06:21	11/28/2001	23.9	1.9	22.0	7620493.5	708970.3	45.588874	-122.772197	885	8.5	1.5	6	2
35b	1	15:26:03	11/28/2001	42.7	2.1	40.6	7620541.9	709006.6	45.588977	-122.772012	886	8.9	1.1	7	2
35b	2	15:26:41	11/28/2001	42.8	2.1	40.7	7620557.1	708998.3	45.588955	-122.771951	890	8.9	1.1	7	2
35b	3	15:27:14	11/28/2001	42.9	2.1	40.8	7620544.2	709006.4	45.588977	-122.772003	891	8.9	1.1	7	2
35c	1	15:33:21	11/28/2001	59.0	2.2	56.8	7620945.6	709332.3	45.589901	-122.770471	895	9.1	0.9	8	2
35c	2	15:34:13	11/28/2001	58.9	2.2	56.7	7620947.3	709315.5	45.589855	-122.770462	896	9.1	0.9	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
35c	3	15:34:58	11/28/2001	59.2	2.2	57.0	7620939.1	709314.7	45.589852	-122.770494	901	9.1	0.9	8	2
35d	1	15:39:15	11/28/2001	47.4	2.2	45.2	7621305.5	709601.0	45.590665	-122.769095	902	9.1	0.9	8	2
35d	2	15:40:05	11/28/2001	46.5	2.3	44.2	7621304.8	709606.7	45.590681	-122.769098	906	9.1	0.9	8	2
35d	3	15:40:40	11/28/2001	48.4	2.3	46.1	7621298.9	709607.2	45.590682	-122.769122	907	9.1	0.9	8	2
35e	1	15:44:46	11/28/2001	15.7	2.3	13.4	7621411.8	709671.5	45.590867	-122.768688	911	9.1	0.9	8	2
35e	2	15:45:24	11/28/2001	15.0	2.3	12.7	7621418.1	709668.8	45.590860	-122.768663	912	9.1	0.9	8	2
35e	3	15:46:09	11/28/2001	14.9	2.3	12.6	7621415.9	709667.7	45.590857	-122.768672	917	9.1	0.9	8	2
36d	1	16:00:53	11/28/2001	8.9	2.4	6.5	7621771.6	709138.0	45.589432	-122.767224	917	9.1	0.9	8	2
36d	2	16:01:33	11/28/2001	10.8	2.4	8.4	7621765.8	709136.5	45.589427	-122.767247	922	9.2	0.8	9	2
36d	3	16:02:14	11/28/2001	11.2	2.4	8.8	7621762.6	709138.8	45.589433	-122.767260	923	9.2	0.8	9	2
36c	1	16:07:43	11/28/2001	63.1	2.4	60.7	7621526.4	708933.8	45.588853	-122.768160	928	9.0	1.0	7	2
36c	2	16:08:24	11/28/2001	63.0	2.4	60.6	7621525.2	708939.9	45.588870	-122.768165	929	9.1	0.9	8	2
36c	3	16:08:58	11/28/2001	63.0	2.4	60.6	7621523.2	708940.2	45.588870	-122.768173	934	9.1	0.9	8	2
36b	1	16:12:38	11/28/2001	54.5	2.4	52.1	7621205.9	708695.4	45.588175	-122.769385	935	9.1	0.9	8	2
36b	2	16:13:38	11/28/2001	54.5	2.4	52.1	7621202.4	708696.8	45.588178	-122.769399	940	9.0	1.0	7	2
36b	3	16:14:21	11/28/2001	54.9	2.4	52.5	7621212.3	708700.1	45.588188	-122.769360	941	9.1	0.9	8	2
36a	1	16:17:41	11/28/2001	39.4	2.4	37.0	7620971.7	708514.9	45.587662	-122.770279	945	8.5	1.5	6	2
36a	2	16:18:17	11/28/2001	39.5	2.4	37.1	7620974.9	708516.5	45.587667	-122.770267	946	8.8	1.2	7	2
36a	3	16:19:06	11/28/2001	39.5	2.4	37.1	7620970.9	708516.6	45.587667	-122.770283	951	8.8	1.2	7	2
37a	1	16:24:43	11/28/2001	14.9	2.4	12.5	7621346.5	707920.9	45.586062	-122.768751	952	8.8	1.2	7	2
37a	2	16:25:24	11/28/2001	14.7	2.4	12.3	7621350.2	707919.3	45.586058	-122.768736	957	8.8	1.2	7	2
37a	3	16:26:04	11/28/2001	15.2	2.4	12.8	7621350.9	707923.1	45.586069	-122.768734	958	8.8	1.2	7	2
37b	1	16:29:08	11/28/2001	51.9	2.4	49.5	7621448.6	708017.3	45.586334	-122.768363	963	8.8	1.2	7	2
37b	2	16:29:52	11/28/2001	51.6	2.4	49.2	7621451.4	708013.7	45.586325	-122.768351	964	8.8	1.2	7	2
37b	3	16:30:34	11/28/2001	52.2	2.4	49.8	7621439.0	708021.5	45.586345	-122.768401	969	8.8	1.2	7	2
37c	1	16:34:57	11/28/2001	52.5	2.4	50.1	7621787.0	708296.5	45.587126	-122.767072	970	8.9	1.1	8	2
37c	2	16:35:39	11/28/2001	52.6	2.4	50.2	7621791.3	708294.1	45.587120	-122.767055	975	8.9	1.1	8	2
37c	3	16:36:24	11/28/2001	52.4	2.4	50.0	7621779.8	708299.9	45.587135	-122.767100	976	8.9	1.1	8	2
37e	1	8:22:52	11/29/2001	11.5	1.6	9.9	7622217.1	708550.2	45.587855	-122.765420	985	8.9	1.1	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
37e	2	8:26:53	11/29/2001	9.4	1.5	7.9	7622228.5	708546.3	45.587845	-122.765376	995	8.9	1.1	7	2
37e	3	8:27:47	11/29/2001	10.4	1.5	8.9	7622225.8	708543.6	45.587837	-122.765386	996	8.8	1.2	7	2
37d	1	8:35:06	11/29/2001	32.0	1.5	30.5	7622107.5	708537.0	45.587810	-122.765847	1002	8.8	1.2	7	2
37d	2	8:35:48	11/29/2001	32.1	1.5	30.6	7622104.5	708538.6	45.587814	-122.765859	1007	8.8	1.2	7	2
37d	3	8:36:27	11/29/2001	41.6	1.5	40.1	7622101.1	708534.9	45.587804	-122.765872	1008	8.8	1.2	7	2
38e	1	8:43:42	11/29/2001	18.2	1.5	16.7	7622566.2	708199.0	45.586919	-122.764019	1013	8.8	1.2	7	2
38e	2	8:44:22	11/29/2001	18.4	1.5	16.9	7622565.4	708199.3	45.586919	-122.764022	1014	8.6	1.4	6	2
38e	3	8:45:02	11/29/2001	19.3	1.5	17.8	7622562.3	708200.9	45.586924	-122.764034	1019	8.6	1.4	6	2
38d	1	8:47:51	11/29/2001	37.7	1.5	36.2	7622512.4	708139.3	45.586751	-122.764223	1020	8.8	1.2	7	2
38d	2	8:48:30	11/29/2001	36.9	1.5	35.4	7622513.9	708135.9	45.586742	-122.764216	1025	8.8	1.2	7	2
38d	3	8:49:15	11/29/2001	36.9	1.4	35.5	7622511.3	708137.4	45.586745	-122.764227	1026	8.8	1.2	7	2
38c	1	8:55:12	11/29/2001	57.2	1.4	55.8	7622092.0	707723.3	45.585578	-122.765818	1031	8.7	1.3	6	2
38c	2	8:55:53	11/29/2001	57.0	1.4	55.6	7622093.8	707719.0	45.585566	-122.765811	1032	8.7	1.3	6	2
38c	3	8:56:32	11/29/2001	56.9	1.4	55.5	7622092.4	707717.8	45.585563	-122.765816	1037	8.8	1.2	7	2
38b	1	9:00:56	11/29/2001	43.5	1.4	42.1	7621891.3	707499.7	45.584949	-122.766577	1038	8.8	1.2	7	2
38b	2	9:01:41	11/29/2001	44.3	1.4	42.9	7621887.7	707502.6	45.584957	-122.766592	1042	8.8	1.2	7	2
38b	3	9:03:08	11/29/2001	42.2	1.4	40.8	7621885.9	707508.1	45.584972	-122.766600	1048	8.6	1.4	6	2
38a	1	9:06:16	11/29/2001	20.2	1.4	18.8	7621820.8	707441.1	45.584783	-122.766846	1049	8.3	1.7	5	2
38a	2	9:06:57	11/29/2001	20.3	1.4	18.9	7621821.4	707439.2	45.584778	-122.766844	1054	8.3	1.7	5	2
38a	3	9:08:44	11/29/2001	20.7	1.4	19.3	7621824.4	707438.9	45.584778	-122.766832	1060	7.6	2.4	5	2
39a	1	9:14:29	11/29/2001	8.6	1.3	7.3	7622212.4	706815.5	45.583099	-122.765249	1061	8.6	1.4	6	2
39a	2	9:15:08	11/29/2001	8.8	1.3	7.5	7622212.4	706816.8	45.583102	-122.765249	1066	8.6	1.4	6	2
39a	3	9:15:43	11/29/2001	8.9	1.3	7.6	7622213.5	706814.8	45.583097	-122.765244	1067	8.4	1.6	5	2
39b	1	9:19:36	11/29/2001	27.7	1.3	26.4	7622293.6	706890.0	45.583309	-122.764940	1072	8.4	1.6	5	2
39b	2	9:20:12	11/29/2001	28.0	1.3	26.7	7622294.5	706889.4	45.583307	-122.764936	1073	8.4	1.6	5	2
39b	3	9:20:53	11/29/2001	27.5	1.3	26.2	7622295.8	706887.0	45.583301	-122.764931	1078	8.4	1.6	5	2
39c	1	9:25:23	11/29/2001	49.6	1.3	48.3	7622486.3	707133.5	45.583991	-122.764214	1079	8.4	1.6	5	2
39c	2	9:26:17	11/29/2001	50.1	1.3	48.8	7622487.6	707132.2	45.583988	-122.764209	1084	8.4	1.6	5	2
39c	3	9:26:58	11/29/2001	48.8	1.3	47.5	7622485.8	707136.6	45.584000	-122.764217	1085	8.4	1.6	5	2
39d	1	9:30:31	11/29/2001	53.2	1.3	51.9	7622799.1	707455.5	45.584898	-122.763028	1090	8.4	1.6	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
39d	2	9:31:09	11/29/2001	53.2	1.3	51.9	7622795.0	707459.6	45.584909	-122.763045	1091	8.4	1.6	6	2
39d	3	9:31:57	11/29/2001	53.2	1.3	51.9	7622802.3	707455.9	45.584899	-122.763016	1096	8.4	1.6	6	2
39e	1	9:49:12	11/29/2001	20.4	1.2	19.2	7623004.6	707689.4	45.585555	-122.762252	1107	8.8	1.2	7	2
39e	2	9:52:32	11/29/2001	21.2	1.2	20.0	7623009.6	707685.7	45.585546	-122.762232	1113	8.5	1.5	6	2
39e	3	9:53:19	11/29/2001	20.9	1.2	19.7	7623006.3	707686.1	45.585546	-122.762244	1118	8.8	1.2	7	2
39f	1	9:58:04	11/29/2001	11.2	1.2	10.0	7623088.8	707712.8	45.585626	-122.761925	1119	8.3	1.7	6	2
39f	2	9:58:44	11/29/2001	11.4	1.2	10.2	7623086.8	707714.5	45.585630	-122.761933	1123	8.3	1.7	6	2
39f	3	9:59:26	11/29/2001	11.6	1.2	10.4	7623085.2	707713.4	45.585627	-122.761939	1124	8.3	1.7	6	2
40e	1	10:11:38	11/29/2001	33.7	1.1	32.6	7623472.5	707301.8	45.584529	-122.760382	1129	8.7	1.3	7	2
40e	2	10:12:18	11/29/2001	34.0	1.1	32.9	7623470.9	707301.3	45.584527	-122.760388	1130	8.9	1.1	8	2
40e	3	10:13:15	11/29/2001	35.7	1.1	34.6	7623467.7	707300.9	45.584526	-122.760401	1135	8.7	1.3	7	2
40d	1	10:18:32	11/29/2001	55.2	1.1	54.1	7623153.7	706964.2	45.583578	-122.761590	1136	8.9	1.1	8	2
40d	2	10:19:14	11/29/2001	55.3	1.1	54.2	7623150.8	706957.6	45.583560	-122.761600	1141	8.9	1.1	8	2
40d	3	10:19:59	11/29/2001	55.3	1.1	54.2	7623147.1	706959.1	45.583564	-122.761615	1142	8.9	1.1	8	2
40c	1	10:23:58	11/29/2001	53.0	1.1	51.9	7622857.1	706649.2	45.582692	-122.762714	1147	8.9	1.1	8	2
40c	2	10:24:34	11/29/2001	52.9	1.1	51.8	7622850.6	706655.9	45.582710	-122.762740	1148	8.9	1.1	8	2
40c	3	10:25:11	11/29/2001	52.8	1.1	51.7	7622851.6	706651.7	45.582698	-122.762735	1153	8.9	1.1	8	2
40b	1	10:29:13	11/29/2001	25.1	1.1	24.0	7622742.4	706521.4	45.582333	-122.763147	1154	8.9	1.1	8	2
40b	2	10:29:55	11/29/2001	25.7	1.1	24.6	7622740.0	706523.4	45.582338	-122.763157	1159	8.9	1.1	8	2
40b	3	10:30:31	11/29/2001	25.6	1.1	24.5	7622741.9	706522.6	45.582336	-122.763149	1160	8.9	1.1	8	2
40a	1	10:35:07	11/29/2001	10.3	1.0	9.3	7622645.0	706413.8	45.582030	-122.763516	1165	9.1	0.9	9	2
40a	2	10:35:48	11/29/2001	10.1	1.0	9.1	7622648.4	706412.3	45.582027	-122.763503	1166	9.1	0.9	9	2
40a	3	10:36:30	11/29/2001	9.9	1.0	8.9	7622641.0	706414.5	45.582032	-122.763532	1171	8.9	1.1	8	2
41a	1	10:44:54	11/29/2001	8.7	1.0	7.7	7623355.6	706029.2	45.581031	-122.760700	1172	9.1	0.9	9	2
41a	2	10:45:42	11/29/2001	9.4	1.0	8.4	7623355.3	706029.0	45.581030	-122.760701	1177	9.1	0.9	9	2
41a	3	10:46:22	11/29/2001	9.3	1.0	8.3	7623353.0	706033.8	45.581043	-122.760710	1178	9.1	0.9	9	2
41b	1	10:54:01	11/29/2001	51.2	1.0	50.2	7623543.1	706366.2	45.581969	-122.760004	1183	8.9	1.1	8	2
41b	2	10:54:45	11/29/2001	51.2	1.0	50.2	7623540.9	706375.8	45.581995	-122.760014	1184	8.6	1.4	7	2
41b	3	10:55:24	11/29/2001	51.2	1.0	50.2	7623534.5	706378.6	45.582002	-122.760039	1189	8.9	1.1	8	2
41c	1	10:59:37	11/29/2001	58.9	1.0	57.9	7623697.2	706632.2	45.582710	-122.759432	1190	9.1	0.9	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
41c	2	11:00:17	11/29/2001	58.9	1.0	57.9	7623692.1	706633.3	45.582713	-122.759452	1195	9.1	0.9	9	2
41c	3	11:00:59	11/29/2001	58.7	1.0	57.7	7623694.6	706627.8	45.582698	-122.759441	1196	9.1	0.9	9	2
41d	1	11:05:35	11/29/2001	28.8	0.9	27.9	7623899.2	706974.6	45.583664	-122.758680	1201	9.1	0.9	9	2
41d	2	11:06:13	11/29/2001	29.2	0.9	28.3	7623896.0	706974.3	45.583663	-122.758693	1202	9.1	0.9	9	2
41d	3	11:06:56	11/29/2001	29.1	0.9	28.2	7623893.8	706975.5	45.583666	-122.758702	1207	9.1	0.9	9	2
42e	1	11:12:30	11/29/2001	8.1	0.9	7.2	7624505.7	706707.1	45.582977	-122.756283	1208	9.1	0.9	9	2
42e	2	11:13:06	11/29/2001	9.1	0.9	8.2	7624502.8	706705.5	45.582973	-122.756295	1213	9.1	0.9	9	2
42e	3	11:13:45	11/29/2001	9.1	0.9	8.2	7624503.5	706705.3	45.582972	-122.756292	1214	9.1	0.9	9	2
42d	1	11:17:26	11/29/2001	22.4	0.9	21.5	7624445.4	706618.2	45.582729	-122.756509	1220	9.1	0.9	9	2
42d	2	11:18:06	11/29/2001	22.7	0.9	21.8	7624442.0	706619.3	45.582732	-122.756522	1225	9.1	0.9	9	2
42d	3	11:18:46	11/29/2001	23.0	0.9	22.1	7624440.5	706617.7	45.582727	-122.756528	1226	9.1	0.9	9	2
42c	1	11:23:18	11/29/2001	55.3	0.9	54.4	7624196.6	706164.0	45.581465	-122.757431	1231	9.1	0.9	9	2
42c	2	11:23:59	11/29/2001	55.2	0.9	54.3	7624189.3	706161.7	45.581458	-122.757459	1232	9.1	0.9	9	2
42c	3	11:24:35	11/29/2001	55.1	0.9	54.2	7624185.1	706168.5	45.581476	-122.757476	1237	9.1	0.9	9	2
43a	1	11:40:47	11/29/2001	8.6	0.8	7.8	7624450.5	705340.9	45.579227	-122.756350	1238	8.9	1.1	8	2
43a	2	11:41:22	11/29/2001	8.4	0.8	7.6	7624450.2	705341.2	45.579228	-122.756351	1242	8.9	1.1	8	2
43a	3	11:41:57	11/29/2001	8.3	0.8	7.5	7624452.0	705340.4	45.579226	-122.756344	1243	8.9	1.1	8	2
43b	1	11:46:28	11/29/2001	37.4	0.8	36.6	7624475.9	705442.2	45.579507	-122.756262	1248	9.0	1.0	9	2
43b	2	11:47:13	11/29/2001	38.4	0.8	37.6	7624482.8	705441.0	45.579504	-122.756235	1249	9.0	1.0	9	2
43b	3	11:47:58	11/29/2001	38.6	0.8	37.8	7624484.3	705441.2	45.579505	-122.756229	1254	9.0	1.0	9	2
43c	1	11:51:45	11/29/2001	54.4	0.8	53.6	7624658.9	705705.4	45.580243	-122.755576	1255	9.0	1.0	9	2
43c	2	11:52:25	11/29/2001	54.5	0.8	53.7	7624661.1	705704.7	45.580241	-122.755567	1260	9.0	1.0	9	2
43c	3	11:53:06	11/29/2001	53.7	0.8	52.9	7624654.3	705709.6	45.580254	-122.755594	1261	9.0	1.0	9	2
43d	1	11:59:09	11/29/2001	51.6	0.8	50.8	7624811.7	705952.7	45.580933	-122.755006	1266	9.0	1.0	9	2
43d	2	11:59:48	11/29/2001	51.9	0.8	51.1	7624808.7	705955.1	45.580939	-122.755018	1267	9.0	1.0	9	2
43d	3	12:00:32	11/29/2001	52.2	0.8	51.4	7624806.4	705955.7	45.580940	-122.755027	1272	9.0	1.0	9	2
43e	1	12:04:18	11/29/2001	33.6	0.8	32.8	7625002.8	706281.9	45.581850	-122.754296	1273	8.9	1.1	8	2
43e	2	12:04:58	11/29/2001	33.5	0.8	32.7	7625004.9	706280.2	45.581845	-122.754288	1278	8.9	1.1	8	2
43e	3	12:05:37	11/29/2001	33.5	0.8	32.7	7625002.1	706280.8	45.581847	-122.754299	1279	8.7	1.3	7	2
43f	1	12:08:57	11/29/2001	13.4	0.8	12.6	7625066.6	706350.8	45.582043	-122.754054	1284	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
43f	2	12:09:34	11/29/2001	13.4	0.8	12.6	7625067.2	706350.3	45.582042	-122.754052	1285	8.9	1.1	8	2
43f	3	12:10:10	11/29/2001	13.7	0.8	12.9	7625067.0	706348.4	45.582037	-122.754053	1290	8.7	1.3	7	2
44e	1	13:04:13	11/29/2001	8.7	0.7	8.0	7625655.3	706060.0	45.581291	-122.751725	1291	8.9	1.1	8	2
44e	2	13:04:54	11/29/2001	9.4	0.7	8.7	7625657.5	706057.9	45.581285	-122.751716	1296	8.1	1.9	7	2
44e	3	13:05:37	11/29/2001	8.6	0.7	7.9	7625658.3	706059.2	45.581289	-122.751712	1297	9.1	0.9	9	2
44d	1	13:09:22	11/29/2001	25.9	0.7	25.2	7625618.6	705989.6	45.581095	-122.751860	1302	9.0	1.0	8	2
44d	2	13:10:03	11/29/2001	26.2	0.7	25.5	7625613.0	705989.5	45.581095	-122.751882	1303	8.9	1.1	8	2
44d	3	13:10:40	11/29/2001	26.2	0.7	25.5	7625615.4	705992.7	45.581103	-122.751873	1308	8.9	1.1	7	2
44c	1	13:14:27	11/29/2001	50.3	0.7	49.6	7625346.0	705520.3	45.579788	-122.752873	1309	9.0	1.0	8	2
44c	2	13:15:07	11/29/2001	50.5	0.7	49.8	7625346.7	705520.4	45.579788	-122.752870	1314	9.0	1.0	8	2
44c	3	13:15:46	11/29/2001	50.4	0.7	49.7	7625353.3	705522.9	45.579796	-122.752845	1315	8.9	1.1	7	2
44b	1	13:18:54	11/29/2001	52.7	0.7	52.0	7625180.8	705238.3	45.579002	-122.753487	1320	9.0	1.0	8	2
44b	2	13:19:31	11/29/2001	52.5	0.7	51.8	7625177.4	705242.0	45.579012	-122.753501	1321	9.0	1.0	8	2
44b	3	13:20:07	11/29/2001	52.7	0.7	52.0	7625176.6	705239.9	45.579006	-122.753504	1326	9.0	1.0	8	2
44a	1	13:23:14	11/29/2001	10.6	0.7	9.9	7625048.3	705031.0	45.578424	-122.753982	1327	9.0	1.0	8	2
44a	2	13:23:54	11/29/2001	10.4	0.7	9.7	7625046.9	705031.8	45.578426	-122.753988	1332	9.0	1.0	8	2
44a	3	13:24:29	11/29/2001	10.5	0.7	9.8	7625050.0	705031.6	45.578425	-122.753976	1333	9.0	1.0	8	2
45a	1	13:54:22	11/29/2001	7.2	0.8	6.4	7625583.6	704684.0	45.577513	-122.751855	1354	8.9	1.1	8	2
45a	2	13:54:59	11/29/2001	7.6	0.8	6.8	7625582.2	704690.0	45.577530	-122.751861	1358	8.9	1.1	8	2
45a	3	13:55:38	11/29/2001	7.8	0.8	7.0	7625583.2	704691.7	45.577534	-122.751857	1359	8.8	1.2	7	2
45b	1	13:58:51	11/29/2001	47.0	0.8	46.2	7625646.8	704801.0	45.577839	-122.751621	1364	8.9	1.1	8	2
45b	2	13:59:32	11/29/2001	47.4	0.8	46.6	7625650.5	704800.6	45.577838	-122.751606	1365	8.9	1.1	8	2
45b	3	14:00:12	11/29/2001	48.5	0.8	47.7	7625651.9	704803.5	45.577846	-122.751601	1370	8.7	1.3	7	2
45c	1	14:04:27	11/29/2001	53.5	0.8	52.7	7625931.3	705295.3	45.579216	-122.750564	1371	8.7	1.3	7	2
45c	2	14:05:35	11/29/2001	53.6	0.8	52.8	7625933.0	705284.6	45.579187	-122.750556	1375	8.7	1.3	7	2
45c	3	14:06:07	11/29/2001	53.6	0.8	52.8	7625933.0	705281.2	45.579177	-122.750556	1376	8.7	1.3	7	2
45d	1	14:09:55	11/29/2001	21.7	0.9	20.8	7626255.6	705793.4	45.580606	-122.749352	1381	8.7	1.3	7	2
45d	2	14:10:31	11/29/2001	21.8	0.9	20.9	7626251.7	705793.1	45.580605	-122.749367	1382	8.7	1.3	7	2
45d	3	14:11:10	11/29/2001	21.8	0.9	20.9	7626252.0	705792.9	45.580605	-122.749366	1387	8.7	1.3	7	2
45e	1	14:13:36	11/29/2001	13.9	0.9	13.0	7626285.4	705893.2	45.580882	-122.749246	1388	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
45e	2	14:14:15	11/29/2001	13.9	0.9	13.0	7626287.8	705892.1	45.580879	-122.749237	1393	8.7	1.3	7	2
45e	3	14:14:52	11/29/2001	14.1	0.9	13.2	7626282.0	705889.8	45.580873	-122.749259	1394	8.7	1.3	7	2
46f	1	14:21:08	11/29/2001	18.7	1.0	17.7	7627054.1	705784.1	45.580642	-122.746233	1399	8.7	1.3	7	2
46f	2	14:21:47	11/29/2001	18.4	1.0	17.4	7627055.4	705784.7	45.580643	-122.746228	1402	8.7	1.3	7	2
46f	3	14:22:25	11/29/2001	18.1	1.0	17.1	7627056.9	705781.4	45.580634	-122.746222	1405	8.7	1.3	7	2
46e	1	14:30:20	11/29/2001	36.3	1.1	35.2	7627003.9	705693.8	45.580390	-122.746420	1405	8.7	1.3	7	2
46e	2	14:30:58	11/29/2001	37.3	1.1	36.2	7626997.0	705690.8	45.580381	-122.746446	1410	8.7	1.3	7	2
46e	3	14:32:41	11/29/2001	37.8	1.1	36.7	7626997.3	705681.4	45.580356	-122.746444	1413	8.7	1.3	7	2
46d	1	14:37:40	11/29/2001	50.2	1.1	49.1	7626440.3	704825.0	45.577965	-122.748525	1416	8.7	1.3	7	2
46d	2	14:38:33	11/29/2001	50.1	1.2	48.9	7626446.5	704816.3	45.577942	-122.748500	1420	8.7	1.3	7	2
46d	3	14:39:24	11/29/2001	50.0	1.2	48.8	7626440.9	704823.0	45.577960	-122.748523	1421	8.7	1.3	7	2
46c	1	14:42:49	11/29/2001	49.1	1.2	47.9	7626260.6	704545.9	45.577186	-122.749197	1426	8.7	1.3	7	2
46c	2	14:43:29	11/29/2001	48.8	1.2	47.6	7626259.0	704547.6	45.577191	-122.749203	1427	8.7	1.3	7	2
46c	3	14:44:17	11/29/2001	48.2	1.2	47.0	7626257.6	704549.7	45.577197	-122.749209	1431	8.7	1.3	7	2
46b	1	14:47:10	11/29/2001	30.3	1.3	29.0	7626155.9	704399.8	45.576778	-122.749589	1432	8.7	1.3	7	2
46b	2	14:48:07	11/29/2001	31.4	1.3	30.1	7626152.4	704402.0	45.576784	-122.749603	1436	8.5	1.5	6	2
46b	3	14:49:42	11/29/2001	30.5	1.3	29.2	7626157.4	704394.9	45.576765	-122.749583	1441	8.7	1.3	7	2
46a	1	14:53:18	11/29/2001	11.3	1.4	9.9	7626104.8	704322.2	45.576561	-122.749781	1442	8.5	1.5	6	2
46a	2	14:53:59	11/29/2001	11.7	1.4	10.3	7626101.2	704325.5	45.576570	-122.749795	1446	8.5	1.5	6	2
46a	3	14:54:37	11/29/2001	11.6	1.4	10.2	7626100.8	704323.9	45.576566	-122.749796	1447	8.7	1.3	7	2
47a	1	15:00:33	11/29/2001	20.4	1.5	18.9	7626530.5	703884.6	45.575394	-122.748071	1451	8.5	1.5	6	2
47a	2	15:01:14	11/29/2001	20.4	1.5	18.9	7626529.1	703886.6	45.575399	-122.748077	1452	8.5	1.5	6	2
47a	3	15:01:55	11/29/2001	20.6	1.5	19.1	7626528.5	703888.9	45.575406	-122.748079	1456	8.5	1.5	6	2
47b	1	15:05:39	11/29/2001	39.6	1.5	38.1	7626598.4	703985.5	45.575676	-122.747817	1457	8.8	1.2	7	2
47b	2	15:06:22	11/29/2001	39.8	1.5	38.3	7626592.5	703988.1	45.575682	-122.747840	1462	8.6	1.4	6	2
47b	3	15:07:05	11/29/2001	40.2	1.5	38.7	7626589.9	703986.9	45.575679	-122.747850	1463	8.6	1.4	6	2
47c	1	15:10:59	11/29/2001	55.9	1.6	54.3	7626886.7	704283.6	45.576515	-122.746724	1468	6.8	3.2	5	2
47c	2	15:11:35	11/29/2001	55.7	1.6	54.1	7626886.0	704285.2	45.576519	-122.746727	1469	6.8	3.2	5	2
47c	3	15:12:25	11/29/2001	55.9	1.6	54.3	7626883.5	704289.0	45.576530	-122.746737	1474	6.8	3.2	5	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
47d	1	15:17:18	11/29/2001	28.5	1.7	26.8	7627350.3	704801.5	45.577970	-122.744970	1475	8.6	1.4	6	2
47d	2	15:17:57	11/29/2001	28.7	1.7	27.0	7627345.6	704803.5	45.577975	-122.744989	1480	8.6	1.4	6	2
47d	3	15:18:35	11/29/2001	29.1	1.7	27.4	7627342.8	704803.5	45.577975	-122.745000	1481	8.6	1.4	6	2
47e	1	15:27:48	11/29/2001	14.6	1.8	12.8	7627369.6	704822.8	45.578030	-122.744897	1486	9.1	0.9	8	2
47e	2	15:28:28	11/29/2001	16.2	1.8	14.4	7627365.4	704825.2	45.578036	-122.744914	1487	9.1	0.9	8	2
47e	3	15:29:09	11/29/2001	16.4	1.8	14.6	7627363.6	704824.5	45.578034	-122.744921	1492	9.1	0.9	8	2
48f	1	15:45:32	11/29/2001	12.2	2.0	10.2	7627991.3	704504.9	45.577206	-122.742436	1493	8.6	1.4	6	2
48f	2	15:46:16	11/29/2001	12.1	2.1	10.0	7627989.6	704509.7	45.577219	-122.742443	1498	9.0	1.0	7	2
48f	3	15:46:53	11/29/2001	12.3	2.1	10.2	7627993.9	704509.6	45.577219	-122.742426	1499	9.1	0.9	8	2
48e	1	15:52:21	11/29/2001	20.0	2.1	17.9	7627873.6	704397.4	45.576902	-122.742883	1504	9.1	0.9	8	2
48e	2	15:53:09	11/29/2001	16.8	2.1	14.7	7627876.5	704398.9	45.576907	-122.742872	1505	9.1	0.9	8	2
48e	3	15:53:50	11/29/2001	19.4	2.1	17.3	7627874.6	704399.6	45.576908	-122.742880	1510	8.7	1.3	7	2
48d	1	16:00:25	11/29/2001	59.5	2.2	57.3	7627554.6	704052.8	45.575933	-122.744091	1511	9.1	0.9	8	2
48d	2	16:01:06	11/29/2001	59.9	2.2	57.7	7627551.3	704054.1	45.575936	-122.744104	1516	9.1	0.9	8	2
48d	3	16:01:50	11/29/2001	59.6	2.2	57.4	7627548.3	704050.4	45.575926	-122.744116	1517	8.8	1.2	7	2
48c	1	16:06:13	11/29/2001	50.6	2.3	48.3	7627192.6	703680.5	45.574885	-122.745464	1522	8.6	1.4	6	2
48c	2	16:06:51	11/29/2001	50.6	2.3	48.3	7627190.5	703681.2	45.574887	-122.745472	1523	8.8	1.2	7	2
48c	3	16:07:28	11/29/2001	50.3	2.3	48.0	7627187.5	703681.0	45.574886	-122.745484	1527	8.8	1.2	7	2
48b	1	16:11:10	11/29/2001	30.2	2.3	27.9	7627035.0	703516.3	45.574423	-122.746062	1528	8.6	1.4	6	2
48b	2	16:11:51	11/29/2001	30.4	2.3	28.1	7627034.0	703517.7	45.574427	-122.746066	1533	8.8	1.2	7	2
48b	3	16:12:35	11/29/2001	30.4	2.3	28.1	7627032.8	703516.5	45.574423	-122.746070	1534	8.8	1.2	7	2
48a	1	16:15:19	11/29/2001	19.1	2.3	16.8	7626951.4	703444.1	45.574218	-122.746380	1539	8.8	1.2	7	2
48a	2	16:15:56	11/29/2001	19.0	2.3	16.7	7626950.5	703445.3	45.574222	-122.746384	1540	8.8	1.2	7	2
48a	3	16:16:38	11/29/2001	19.1	2.4	16.7	7626950.2	703446.7	45.574225	-122.746385	1545	8.8	1.2	7	2
49a	1	16:22:48	11/29/2001	9.8	2.4	7.4	7627378.9	702931.8	45.572846	-122.744656	1546	8.9	1.1	8	2
49a	2	16:23:26	11/29/2001	10.1	2.4	7.7	7627380.9	702931.8	45.572847	-122.744648	1551	8.9	1.1	8	2
49a	3	16:24:01	11/29/2001	10.1	2.4	7.7	7627379.8	702935.0	45.572855	-122.744653	1552	8.9	1.1	8	2
49b	1	16:26:47	11/29/2001	22.2	2.4	19.8	7627462.9	703032.1	45.573128	-122.744339	1557	8.8	1.2	7	2
49b	2	16:27:24	11/29/2001	22.4	2.4	20.0	7627461.8	703036.9	45.573141	-122.744344	1558	8.3	1.7	6	2
49b	3	16:28:03	11/29/2001	23.8	2.4	21.4	7627465.7	703035.9	45.573139	-122.744328	1563	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
49c	1	16:33:50	11/29/2001	44.6	2.5	42.1	7627589.0	703146.7	45.573452	-122.743859	1564	8.9	1.1	8	2
49c	2	16:34:31	11/29/2001	44.4	2.5	41.9	7627584.8	703146.1	45.573450	-122.743875	1569	8.9	1.1	8	2
49c	3	16:35:04	11/29/2001	44.6	2.5	42.1	7627583.5	703148.2	45.573455	-122.743881	1570	8.9	1.1	8	2
49d	1	16:38:32	11/29/2001	62.7	2.5	60.2	7627911.0	703486.8	45.574409	-122.742639	1575	8.8	1.2	7	2
49d	2	16:39:11	11/29/2001	62.7	2.5	60.2	7627909.6	703487.2	45.574410	-122.742644	1576	8.9	1.1	8	2
49d	3	16:39:52	11/29/2001	62.8	2.5	60.3	7627907.9	703487.9	45.574411	-122.742651	1580	8.9	1.1	8	2
42b	1	7:55:09	11/30/2001	45.7	1.9	43.8	7623935.6	705766.1	45.580354	-122.758407	1587	8.4	1.6	7	2
42b	2	7:55:48	11/30/2001	45.7	1.9	43.8	7623935.3	705767.9	45.580359	-122.758408	1588	8.3	1.7	6	2
42b	3	7:56:29	11/30/2001	46.7	1.8	44.9	7623933.7	705768.8	45.580361	-122.758414	1593	8.3	1.7	6	2
42a	1	8:04:29	11/30/2001	8.5	1.8	6.7	7623931.9	705686.7	45.580136	-122.758412	1594	8.4	1.6	7	2
42a	2	8:05:10	11/30/2001	8.4	1.8	6.6	7623930.6	705694.9	45.580158	-122.758418	1599	8.4	1.6	7	2
42a	3	8:05:56	11/30/2001	8.5	1.8	6.7	7623931.0	705693.1	45.580153	-122.758416	1600	8.4	1.6	7	2
49f	1	8:22:10	11/30/2001	9.2	1.8	7.4	7628492.5	704073.3	45.576061	-122.740432	1605	8.9	1.1	7	2
49f	2	8:22:47	11/30/2001	9.2	1.8	7.4	7628491.8	704076.3	45.576069	-122.740435	1606	8.8	1.2	7	2
49f	3	8:23:28	11/30/2001	9.2	1.8	7.4	7628490.0	704077.4	45.576072	-122.740442	1610	8.8	1.2	7	2
49e	1	8:27:31	11/30/2001	22.1	1.7	20.4	7628404.2	703982.8	45.575806	-122.740767	1611	8.8	1.2	7	2
49e	2	8:28:12	11/30/2001	23.2	1.7	21.5	7628405.3	703978.9	45.575795	-122.740763	1616	8.8	1.2	7	2
49e	3	8:28:57	11/30/2001	23.3	1.7	21.6	7628407.9	703978.2	45.575794	-122.740752	1617	8.8	1.2	7	2
50e	1	8:52:24	11/30/2001	22.7	1.7	21.0	7628903.7	703552.1	45.574663	-122.738770	1622	8.7	1.3	6	2
50e	2	8:53:02	11/30/2001	22.4	1.7	20.7	7628904.5	703555.1	45.574671	-122.738768	1623	8.8	1.2	7	2
50e	3	8:53:41	11/30/2001	21.9	1.7	20.2	7628900.8	703557.6	45.574678	-122.738782	1628	8.8	1.2	7	2
50d	1	9:30:09	11/30/2001	68.4	1.5	66.9	7628496.5	703146.0	45.573519	-122.740316	1629	8.7	1.3	7	2
50d	2	9:31:36	11/30/2001	68.0	1.5	66.5	7628485.4	703139.1	45.573499	-122.740359	1634	8.7	1.3	7	2
50d	3	9:32:21	11/30/2001	68.1	1.5	66.6	7628472.0	703152.3	45.573534	-122.740413	1635	8.8	1.2	8	2
50c	1	9:38:35	11/30/2001	54.0	1.5	52.5	7628291.2	702917.8	45.572878	-122.741093	1640	8.7	1.3	7	2
50c	2	9:39:13	11/30/2001	53.9	1.5	52.4	7628289.0	702913.8	45.572866	-122.741101	1641	8.7	1.3	7	2
50c	3	9:39:50	11/30/2001	54.0	1.5	52.5	7628287.9	702920.8	45.572885	-122.741106	1646	8.7	1.3	7	2
50b	1	9:43:12	11/30/2001	40.6	1.5	39.1	7627981.0	702569.8	45.571900	-122.742266	1647	8.7	1.3	7	2
50b	2	9:43:51	11/30/2001	40.8	1.5	39.3	7627982.8	702566.9	45.571892	-122.742259	1652	8.8	1.2	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
50b	3	9:44:35	11/30/2001	40.3	1.4	38.9	7627979.3	702568.4	45.571896	-122.742272	1653	8.5	1.5	6	2
50a	1	9:50:45	11/30/2001	15.4	1.4	14.0	7627889.0	702501.2	45.571705	-122.742618	1658	8.8	1.2	7	2
50a	2	9:51:26	11/30/2001	15.2	1.4	13.8	7627889.6	702499.9	45.571701	-122.742615	1659	8.8	1.2	7	2
50a	3	9:52:02	11/30/2001	15.5	1.4	14.1	7627888.5	702500.1	45.571702	-122.742620	1664	8.8	1.2	7	2
51a	1	10:01:32	11/30/2001	16.0	1.4	14.6	7628331.1	701968.7	45.570278	-122.740835	1665	8.9	1.1	8	2
51a	2	10:02:12	11/30/2001	16.7	1.4	15.3	7628325.6	701964.8	45.570267	-122.740855	1670	8.4	1.6	8	2
51a	3	10:02:51	11/30/2001	18.1	1.4	16.7	7628323.6	701968.5	45.570278	-122.740864	1671	8.9	1.1	9	2
51b	1	10:05:59	11/30/2001	36.9	1.4	35.5	7628392.0	702033.7	45.570461	-122.740604	1676	8.9	1.1	9	2
51b	2	10:06:46	11/30/2001	37.2	1.4	35.8	7628395.5	702034.1	45.570463	-122.740590	1677	8.9	1.1	9	2
51b	3	10:07:36	11/30/2001	35.7	1.4	34.3	7628389.5	702026.4	45.570441	-122.740612	1682	8.9	1.1	9	2
51c	1	10:11:52	11/30/2001	47.7	1.3	46.4	7628559.8	702219.8	45.570984	-122.739969	1683	8.9	1.1	8	2
51c	2	10:12:29	11/30/2001	47.8	1.3	46.5	7628558.5	702219.8	45.570984	-122.739974	1687	8.9	1.1	8	2
51c	3	10:13:08	11/30/2001	47.9	1.3	46.6	7628557.0	702222.7	45.570992	-122.739980	1688	8.9	1.1	8	2
51d	1	10:17:42	11/30/2001	67.2	1.3	65.9	7628939.4	702630.3	45.572139	-122.738531	1693	8.9	1.1	8	2
51d	2	10:18:22	11/30/2001	67.0	1.3	65.7	7628938.1	702625.0	45.572124	-122.738536	1694	8.9	1.1	8	2
51d	3	10:19:03	11/30/2001	67.1	1.3	65.8	7628932.8	702625.5	45.572125	-122.738557	1699	8.9	1.1	8	2
51e	1	10:24:15	11/30/2001	21.9	1.3	20.6	7629440.8	703136.7	45.573565	-122.736629	1700	8.9	1.1	8	2
51e	2	10:25:10	11/30/2001	21.6	1.3	20.3	7629439.3	703130.9	45.573549	-122.736634	1705	9.1	0.9	9	2
51e	3	10:25:58	11/30/2001	21.6	1.3	20.3	7629439.4	703135.3	45.573561	-122.736634	1706	8.9	1.1	8	2
51f	1	10:32:48	11/30/2001	17.1	1.3	15.8	7629589.6	703266.4	45.573932	-122.736062	1711	7.7	2.3	6	2
51f	2	10:33:29	11/30/2001	16.9	1.3	15.6	7629588.5	703257.1	45.573906	-122.736065	1712	8.8	1.2	7	2
51f	3	10:34:56	11/30/2001	17.4	1.2	16.2	7629584.7	703259.5	45.573913	-122.736081	1728	8.7	1.3	6	2
52e	1	10:43:09	11/30/2001	22.7	1.2	21.5	7630026.1	702627.1	45.572212	-122.734289	1729	8.9	1.1	7	2
52e	2	10:43:51	11/30/2001	23.2	1.2	22.0	7630023.5	702627.5	45.572213	-122.734299	1734	8.9	1.1	7	2
52e	3	10:44:30	11/30/2001	22.2	1.2	21.0	7630022.9	702632.4	45.572227	-122.734302	1735	8.9	1.1	7	2
52d	1	10:51:11	11/30/2001	54.9	1.2	53.7	7629436.7	702225.5	45.571067	-122.736546	1741	9.1	0.9	9	2
52d	2	10:51:54	11/30/2001	55.2	1.2	54.0	7629427.2	702227.3	45.571071	-122.736584	1742	9.1	0.9	9	2
52d	3	10:52:46	11/30/2001	55.5	1.2	54.3	7629429.4	702230.7	45.571080	-122.736576	1747	9.1	0.9	9	2
52c	1	10:59:39	11/30/2001	53.8	1.1	52.7	7629144.1	701911.4	45.570183	-122.737655	1748	9.1	0.9	9	2
52c	2	11:00:29	11/30/2001	53.6	1.1	52.5	7629145.2	701906.9	45.570171	-122.737650	1754	9.1	0.9	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
52c	3	11:01:16	11/30/2001	53.7	1.1	52.6	7629141.8	701913.8	45.570190	-122.737664	1755	9.1	0.9	9	2
52b	1	11:04:34	11/30/2001	22.4	1.1	21.3	7628758.9	701518.3	45.569076	-122.739116	1760	9.1	0.9	9	2
52b	2	11:05:20	11/30/2001	21.2	1.1	20.1	7628758.8	701518.1	45.569076	-122.739116	1761	9.1	0.9	9	2
52b	3	11:06:04	11/30/2001	21.5	1.1	20.4	7628758.4	701520.0	45.569081	-122.739118	1766	9.1	0.9	9	2
52a	1	11:10:14	11/30/2001	11.3	1.1	10.2	7628727.3	701485.3	45.568983	-122.739236	1767	9.1	0.9	9	2
52a	2	11:11:14	11/30/2001	14.2	1.1	13.1	7628734.1	701495.2	45.569011	-122.739210	1772	9.1	0.9	9	2
52a	3	11:13:56	11/30/2001	13.1	1.1	12.0	7628729.5	701486.2	45.568986	-122.739227	1773	9.1	0.9	9	2
53a	1	11:23:31	11/30/2001	17.6	1.1	16.5	7628687.3	700494.2	45.566263	-122.739284	1778	9.1	0.9	9	2
53a	2	11:24:17	11/30/2001	18.1	1.1	17.0	7628685.9	700492.7	45.566259	-122.739290	1779	9.1	0.9	9	2
53a	3	11:27:44	11/30/2001	20.5	1.1	19.4	7628691.1	700497.3	45.566272	-122.739270	1797	9.1	0.9	9	2
53b	1	11:31:12	11/30/2001	41.8	1.0	40.8	7628748.8	700558.1	45.566443	-122.739051	1798	9.1	0.9	9	2
53b	2	11:31:52	11/30/2001	41.5	1.0	40.5	7628749.1	700557.2	45.566441	-122.739050	1803	9.1	0.9	9	2
53b	3	11:32:32	11/30/2001	41.6	1.0	40.6	7628748.5	700558.5	45.566444	-122.739052	1804	9.1	0.9	9	2
53c	1	11:38:20	11/30/2001	51.9	1.0	50.9	7629231.3	701055.0	45.567842	-122.737221	1809	9.1	0.9	9	2
53c	2	11:39:06	11/30/2001	51.9	1.0	50.9	7629236.0	701054.6	45.567841	-122.737203	1810	9.1	0.9	9	2
53c	3	11:39:44	11/30/2001	51.3	1.0	50.3	7629233.0	701063.7	45.567866	-122.737216	1815	9.1	0.9	9	2
53d	1	11:48:30	11/30/2001	60.0	1.0	59.0	7629823.6	701687.3	45.569620	-122.734978	1819	9.0	1.0	9	2
53d	2	11:49:24	11/30/2001	60.0	1.0	59.0	7629820.8	701688.8	45.569624	-122.734989	1820	9.0	1.0	9	2
53d	3	11:50:26	11/30/2001	60.0	1.0	59.0	7629818.6	701694.8	45.569641	-122.734998	1825	9.0	1.0	9	2
53e	1	11:56:23	11/30/2001	25.7	1.0	24.7	7630400.2	702262.8	45.571242	-122.732789	1826	8.8	1.2	8	2
53e	2	11:57:02	11/30/2001	25.3	1.0	24.3	7630399.7	702267.1	45.571254	-122.732792	1831	8.8	1.2	8	2
53e	3	11:57:40	11/30/2001	25.4	1.0	24.4	7630395.6	702268.9	45.571258	-122.732808	1832	8.8	1.2	8	2
54e	1	12:45:36	11/30/2001	29.6	0.8	28.8	7630964.2	701874.4	45.570220	-122.730546	1837	8.7	1.3	7	2
54e	2	12:46:48	11/30/2001	27.3	0.8	26.5	7630946.9	701876.1	45.570223	-122.730614	1838	8.7	1.3	7	2
54e	3	12:47:35	11/30/2001	26.3	0.8	25.5	7630949.2	701870.3	45.570208	-122.730604	1843	8.7	1.3	7	2
54d	1	12:50:55	11/30/2001	39.8	0.8	39.0	7630899.2	701791.4	45.569987	-122.730791	1844	8.7	1.3	7	2
54d	2	12:51:37	11/30/2001	39.4	0.8	38.6	7630896.7	701801.9	45.570016	-122.730801	1849	8.8	1.2	8	2
54d	3	12:52:18	11/30/2001	39.6	0.8	38.8	7630896.1	701794.9	45.569997	-122.730803	1850	8.8	1.2	8	2
54c	1	12:57:22	11/30/2001	51.4	0.8	50.6	7630043.1	700927.2	45.567553	-122.734039	1855	8.8	1.2	8	2
54c	2	12:57:59	11/30/2001	51.2	0.8	50.4	7630041.0	700926.2	45.567550	-122.734047	1856	8.8	1.2	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
54c	3	12:58:48	11/30/2001	51.2	0.8	50.4	7630037.2	700925.6	45.567548	-122.734062	1861	8.8	1.2	8	2
54b	1	13:04:57	11/30/2001	32.1	0.8	31.3	7629500.9	700391.0	45.566042	-122.736097	1862	9.1	0.9	9	2
54b	2	13:05:35	11/30/2001	32.9	0.8	32.1	7629501.3	700391.9	45.566045	-122.736096	1866	9.1	0.9	9	2
54b	3	13:06:11	11/30/2001	33.1	0.8	32.3	7629497.2	700387.9	45.566033	-122.736112	1867	9.1	0.9	9	2
54a	1	13:11:04	11/30/2001	13.1	0.8	12.3	7629154.6	700024.5	45.565011	-122.737410	1872	8.9	1.1	8	2
54a	2	13:11:47	11/30/2001	12.9	0.8	12.1	7629152.7	700024.5	45.565011	-122.737417	1873	8.9	1.1	8	2
54a	3	13:12:30	11/30/2001	13.3	0.8	12.5	7629153.5	700025.9	45.565015	-122.737414	1878	9.0	1.0	8	2
55a	1	13:24:37	11/30/2001	15.8	0.8	15.0	7629962.3	699984.0	45.564961	-122.734253	1879	8.9	1.1	7	2
55a	2	13:25:28	11/30/2001	16.4	0.8	15.6	7629960.4	699984.5	45.564962	-122.734260	1883	8.9	1.1	7	2
55a	3	13:26:08	11/30/2001	16.3	0.8	15.5	7629965.0	699980.4	45.564952	-122.734242	1884	8.3	1.7	6	2
55b	1	13:32:03	11/30/2001	46.4	0.8	45.6	7630293.5	700278.7	45.565794	-122.732992	1888	8.9	1.1	8	2
55b	2	13:32:51	11/30/2001	46.3	0.8	45.5	7630293.7	700274.0	45.565781	-122.732990	1889	8.9	1.1	8	2
55b	3	13:33:27	11/30/2001	46.4	0.8	45.6	7630293.2	700274.6	45.565783	-122.732992	1894	8.9	1.1	8	2
55c	1	13:39:09	11/30/2001	66.1	0.8	65.3	7631076.9	701080.7	45.568052	-122.730020	1895	8.9	1.1	8	2
55c	2	13:39:49	11/30/2001	66.2	0.8	65.4	7631075.5	701077.0	45.568042	-122.730025	1900	8.9	1.1	8	2
55c	3	13:40:28	11/30/2001	66.0	0.8	65.2	7631071.7	701079.7	45.568049	-122.730040	1901	8.9	1.1	8	2
55d	1	13:44:37	11/30/2001	30.3	0.8	29.5	7631558.4	701575.5	45.569445	-122.728194	1906	8.7	1.3	7	2
55d	2	13:45:15	11/30/2001	29.7	0.8	28.9	7631557.8	701576.7	45.569449	-122.728197	1907	8.7	1.3	7	2
55d	3	13:45:54	11/30/2001	30.2	0.8	29.4	7631553.3	701576.8	45.569449	-122.728215	1912	8.7	1.3	7	2
55e	1	13:49:39	11/30/2001	17.1	0.8	16.3	7631619.8	701645.4	45.569642	-122.727962	1913	8.7	1.3	7	2
55e	2	13:50:23	11/30/2001	17.6	0.8	16.8	7631623.4	701643.1	45.569636	-122.727948	1918	8.7	1.3	7	2
55e	3	13:51:20	11/30/2001	16.5	0.8	15.7	7631612.8	701647.8	45.569648	-122.727990	1919	8.3	1.7	6	2
56f	1	13:59:03	11/30/2001	17.0	0.8	16.2	7632730.7	701866.0	45.570330	-122.723649	1922	8.7	1.3	7	2
56f	2	14:00:00	11/30/2001	23.4	0.8	22.6	7632735.5	701860.1	45.570315	-122.723630	1927	8.7	1.3	7	2
56f	3	14:00:48	11/30/2001	24.6	0.8	23.8	7632733.1	701862.4	45.570321	-122.723640	1928	8.7	1.3	7	2
56e	1	14:04:42	11/30/2001	45.9	0.8	45.1	7632295.1	701422.4	45.569081	-122.725302	1932	8.7	1.3	7	2
56e	2	14:05:20	11/30/2001	45.5	0.8	44.7	7632294.7	701427.3	45.569095	-122.725304	1933	8.7	1.3	7	2
56e	3	14:05:57	11/30/2001	45.5	0.8	44.7	7632298.7	701424.7	45.569088	-122.725288	1938	8.7	1.3	7	2
56d	1	14:11:03	11/30/2001	42.5	0.8	41.7	7632137.8	701252.1	45.568602	-122.725898	1939	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
56d	2	14:11:41	11/30/2001	42.3	0.8	41.5	7632138.9	701251.7	45.568602	-122.725894	1944	8.7	1.3	7	2
56d	3	14:12:17	11/30/2001	42.2	0.8	41.4	7632137.8	701248.5	45.568593	-122.725897	1945	8.7	1.3	7	2
56c	1	14:20:08	11/30/2001	56.9	0.8	56.1	7631104.7	700196.8	45.565631	-122.729817	1950	8.7	1.3	7	2
56c	2	14:20:59	11/30/2001	56.7	0.8	55.9	7631103.9	700191.0	45.565615	-122.729819	1951	8.7	1.3	7	2
56c	3	14:21:40	11/30/2001	56.8	0.8	56.0	7631099.9	700198.4	45.565635	-122.729835	1956	8.7	1.3	7	2
56b	1	14:26:24	11/30/2001	33.1	0.8	32.3	7630531.2	699552.5	45.563821	-122.731986	1957	8.7	1.3	7	2
56b	2	14:27:06	11/30/2001	33.6	0.8	32.8	7630538.0	699552.5	45.563822	-122.731959	1962	8.7	1.3	7	2
56b	3	14:27:46	11/30/2001	33.2	0.8	32.4	7630536.6	699556.7	45.563833	-122.731965	1963	8.7	1.3	7	2
56a	1	14:33:04	11/30/2001	12.7	0.8	11.9	7630430.4	699460.8	45.563562	-122.732369	1968	8.7	1.3	7	2
56a	2	14:33:40	11/30/2001	12.4	0.8	11.6	7630434.3	699457.6	45.563554	-122.732354	1969	8.7	1.3	7	2
56a	3	14:34:19	11/30/2001	12.8	0.8	12.0	7630436.0	699457.9	45.563555	-122.732347	1974	8.7	1.3	7	2
57a	1	14:41:10	11/30/2001	10.1	0.9	9.2	7630919.4	699006.7	45.562354	-122.730412	1975	8.7	1.3	7	2
57a	2	14:41:53	11/30/2001	10.0	0.9	9.1	7630920.9	699006.6	45.562354	-122.730406	1980	8.7	1.3	7	2
57a	3	14:42:43	11/30/2001	10.0	0.9	9.1	7630915.9	699011.5	45.562367	-122.730426	1981	8.7	1.3	7	2
57b	1	14:45:35	11/30/2001	33.7	0.9	32.8	7631009.3	699103.2	45.562626	-122.730071	1986	8.7	1.3	7	2
57b	2	14:46:13	11/30/2001	33.4	0.9	32.5	7631005.5	699106.6	45.562635	-122.730087	1987	8.7	1.3	7	2
57b	3	14:46:51	11/30/2001	33.2	0.9	32.3	7631005.3	699110.8	45.562646	-122.730087	1992	8.7	1.3	7	2
57c	1	14:53:50	11/30/2001	55.0	1.0	54.0	7631817.4	699970.1	45.565063	-122.727010	1993	8.3	1.7	5	2
57c	2	14:54:55	11/30/2001	55.1	1.0	54.1	7631814.6	699971.7	45.565068	-122.727022	1998	8.3	1.7	5	2
57c	3	14:55:44	11/30/2001	54.9	1.0	53.9	7631808.4	699972.3	45.565069	-122.727046	1999	8.2	1.8	5	2
58d	1	15:00:28	11/30/2001	53.2	1.0	52.2	7632370.2	699607.6	45.564111	-122.724814	2004	8.2	1.8	5	2
58d	2	15:01:07	11/30/2001	53.3	1.0	52.3	7632374.3	699597.1	45.564083	-122.724797	2005	8.2	1.8	5	2
58d	3	15:01:52	11/30/2001	53.6	1.0	52.6	7632368.6	699601.5	45.564095	-122.724819	2011	8.2	1.8	5	2
58c	1	15:06:06	11/30/2001	48.6	1.1	47.5	7631885.4	699092.5	45.562663	-122.726651	2012	8.6	1.4	6	2
58c	2	15:06:47	11/30/2001	48.3	1.1	47.2	7631883.2	699094.7	45.562669	-122.726659	2017	8.8	1.2	7	2
58c	3	15:07:28	11/30/2001	48.8	1.1	47.7	7631883.7	699100.4	45.562684	-122.726658	2018	8.8	1.2	7	2
58b	1	15:13:27	11/30/2001	26.4	1.2	25.2	7631416.9	698563.3	45.561176	-122.728422	2023	8.6	1.4	6	2
58b	2	15:14:08	11/30/2001	26.8	1.2	25.6	7631422.1	698558.9	45.561165	-122.728401	2024	8.6	1.4	6	2
58b	3	15:14:53	11/30/2001	27.3	1.2	26.1	7631421.9	698556.6	45.561158	-122.728402	2029	8.6	1.4	6	2
58a	1	15:19:04	11/30/2001	12.9	1.3	11.6	7631340.8	698520.0	45.561052	-122.728714	2030	9.1	0.9	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
58a	2	15:19:43	11/30/2001	12.5	1.3	11.2	7631340.2	698521.3	45.561055	-122.728717	2035	9.1	0.9	8	2
58a	3	15:20:19	11/30/2001	13.3	1.3	12.0	7631344.3	698522.0	45.561058	-122.728701	2036	9.1	0.9	8	2
59a	1	15:28:18	11/30/2001	11.7	1.4	10.3	7631508.3	697781.5	45.559040	-122.727981	2041	9.1	0.9	8	2
59a	2	15:28:54	11/30/2001	11.6	1.4	10.2	7631509.8	697782.0	45.559041	-122.727976	2042	9.1	0.9	8	2
59a	3	15:29:35	11/30/2001	11.7	1.4	10.3	7631511.5	697783.5	45.559046	-122.727969	2047	9.1	0.9	8	2
59b	1	15:34:08	11/30/2001	20.6	1.5	19.1	7631672.8	697911.5	45.559409	-122.727353	2048	9.1	0.9	8	2
59b	2	15:34:47	11/30/2001	20.4	1.5	18.9	7631673.5	697911.9	45.559410	-122.727351	2053	9.1	0.9	8	2
59b	3	15:35:25	11/30/2001	20.5	1.5	19.0	7631674.8	697915.0	45.559418	-122.727346	2054	9.1	0.9	8	2
59c	1	15:41:49	11/30/2001	36.7	1.6	35.1	7632117.5	698396.1	45.560771	-122.725670	2059	9.1	0.9	8	2
59c	2	15:42:28	11/30/2001	36.9	1.6	35.3	7632119.4	698400.1	45.560782	-122.725663	2060	9.1	0.9	8	2
59c	3	15:43:51	11/30/2001	37.0	1.6	35.4	7632112.4	698400.6	45.560783	-122.725690	2065	9.1	0.9	8	2
59d	1	15:47:55	11/30/2001	55.6	1.7	53.9	7632646.5	698960.7	45.562359	-122.723666	2066	8.7	1.3	7	2
59d	2	15:48:40	11/30/2001	55.5	1.7	53.8	7632643.0	698962.9	45.562365	-122.723680	2071	9.1	0.9	8	2
59d	3	15:49:56	11/30/2001	55.4	1.7	53.7	7632646.6	698955.9	45.562346	-122.723665	2072	9.0	1.0	7	2
59e	1	15:55:12	11/30/2001	46.9	1.8	45.1	7633009.8	699346.8	45.563445	-122.722290	2077	8.7	1.3	7	2
59e	2	15:55:56	11/30/2001	46.2	1.8	44.4	7633007.5	699348.3	45.563449	-122.722299	2078	8.7	1.3	6	2
59e	3	15:56:41	11/30/2001	46.0	1.8	44.2	7633003.7	699350.6	45.563455	-122.722314	2083	8.2	1.8	5	2
60d	1	16:04:20	11/30/2001	45.2	1.9	43.3	7633504.0	698873.2	45.562184	-122.720310	2084	8.6	1.4	6	2
60d	2	16:05:13	11/30/2001	45.4	1.9	43.5	7633492.1	698875.0	45.562188	-122.720356	2089	8.6	1.4	6	2
60d	3	16:06:00	11/30/2001	44.9	1.9	43.0	7633511.5	698871.2	45.562179	-122.720280	2090	8.7	1.3	6	2
60c	1	16:10:03	11/30/2001	50.1	2.0	48.1	7633016.3	698363.4	45.560749	-122.722158	2095	8.8	1.2	7	2
60c	2	16:10:42	11/30/2001	49.9	2.0	47.9	7633016.6	698358.6	45.560736	-122.722157	2096	8.8	1.2	7	2
60c	3	16:11:21	11/30/2001	49.9	2.0	47.9	7633007.9	698358.1	45.560734	-122.722191	2101	8.8	1.2	7	2
60b	1	16:16:16	11/30/2001	31.5	2.1	29.4	7632407.0	697734.3	45.558978	-122.724469	2102	8.8	1.2	7	2
60b	2	16:17:09	11/30/2001	31.9	2.1	29.8	7632412.3	697739.9	45.558994	-122.724449	2106	8.9	1.1	8	2
60b	3	16:18:01	11/30/2001	31.7	2.1	29.6	7632407.8	697730.7	45.558969	-122.724465	2107	8.9	1.1	8	2
60a	1	16:22:20	11/30/2001	17.4	2.1	15.3	7632266.0	697515.5	45.558368	-122.724996	2112	8.5	1.5	6	2
60a	2	16:22:56	11/30/2001	17.4	2.1	15.3	7632266.4	697517.5	45.558374	-122.724994	2113	8.5	1.5	6	2
60a	3	16:23:33	11/30/2001	17.6	2.1	15.5	7632267.3	697519.6	45.558379	-122.724991	2117	8.5	1.5	6	2
61a	1	16:31:10	11/30/2001	25.9	2.2	23.7	7632781.5	697212.9	45.557577	-122.722951	2118	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
61a	2	16:31:44	11/30/2001	25.8	2.2	23.6	7632780.8	697214.9	45.557583	-122.722954	2123	8.9	1.1	8	2
61a	3	16:32:18	11/30/2001	25.1	2.2	22.9	7632779.0	697221.8	45.557602	-122.722962	2124	8.8	1.2	7	2
61b	1	16:36:06	11/30/2001	42.7	2.3	40.4	7633211.9	697650.2	45.558809	-122.721319	2128	8.9	1.1	8	2
61b	2	16:37:01	11/30/2001	41.1	2.3	38.8	7633213.1	697642.1	45.558787	-122.721313	2129	8.9	1.1	8	2
61b	3	16:37:38	11/30/2001	39.8	2.3	37.5	7633214.5	697638.9	45.558778	-122.721307	2133	8.9	1.1	8	2
61c	1	16:43:36	11/30/2001	49.0	2.4	46.6	7633920.6	698339.2	45.560751	-122.718627	2134	7.9	2.1	5	2
61c	2	16:44:14	11/30/2001	49.2	2.4	46.8	7633916.7	698341.9	45.560758	-122.718642	2139	7.9	2.1	5	2
61c	3	16:45:02	11/30/2001	49.6	2.4	47.2	7633910.8	698323.3	45.560707	-122.718663	2140	7.9	2.1	5	2
61d	1	8:21:59	12/3/2001	12.6	2.0	10.6	7634112.5	698536.8	45.561307	-122.717899	2149	8.8	1.2	7	2
61d	2	8:22:39	12/3/2001	14.3	2.0	12.3	7634107.5	698532.2	45.561294	-122.717918	2150	8.8	1.2	7	2
61d	3	8:23:17	12/3/2001	15.7	2.0	13.7	7634102.8	698534.5	45.561300	-122.717936	2153	8.8	1.2	7	2
62d	1	8:33:19	12/3/2001	12.9	2.0	10.9	7634583.7	698124.6	45.560212	-122.716016	2154	8.7	1.3	6	2
62d	2	8:33:56	12/3/2001	13.5	2.0	11.5	7634582.2	698125.7	45.560215	-122.716021	2159	8.7	1.3	6	2
62d	3	8:34:32	12/3/2001	13.4	2.0	11.4	7634583.9	698125.4	45.560215	-122.716015	2160	8.7	1.3	6	2
62c	1	8:40:46	12/3/2001	60.9	2.0	58.9	7634164.6	697701.8	45.559022	-122.717606	2165	8.7	1.3	6	2
62c	2	8:41:25	12/3/2001	60.9	2.0	58.9	7634163.5	697701.2	45.559020	-122.717610	2166	8.8	1.2	7	2
62c	3	8:42:17	12/3/2001	61.0	2.0	59.0	7634166.6	697700.6	45.559019	-122.717598	2171	8.7	1.3	6	2
62b	1	8:46:47	12/3/2001	41.6	2.0	39.6	7633382.6	696906.7	45.556783	-122.720573	2172	8.6	1.4	6	2
62b	2	8:47:31	12/3/2001	41.4	2.0	39.4	7633380.7	696908.0	45.556787	-122.720580	2177	8.6	1.4	6	2
62b	3	8:48:11	12/3/2001	41.4	2.0	39.4	7633381.8	696907.7	45.556786	-122.720576	2178	8.6	1.4	6	2
62a	1	8:53:32	12/3/2001	9.9	2.0	7.9	7633296.1	696826.5	45.556557	-122.720902	2183	8.6	1.4	6	2
62a	2	8:54:22	12/3/2001	10.0	2.0	8.0	7633294.8	696828.0	45.556561	-122.720907	2184	8.6	1.4	6	2
62a	3	8:55:00	12/3/2001	9.9	2.0	7.9	7633297.2	696825.6	45.556554	-122.720897	2189	8.6	1.4	6	2
63a	1	9:03:24	12/3/2001	27.1	2.0	25.1	7634123.4	696433.5	45.555542	-122.717631	2190	8.6	1.4	6	2
63a	2	9:04:02	12/3/2001	26.5	2.0	24.5	7634119.9	696430.5	45.555533	-122.717644	2194	8.6	1.4	6	2
63a	3	9:04:38	12/3/2001	25.4	2.0	23.4	7634120.1	696428.2	45.555527	-122.717643	2195	8.7	1.3	6	2
63b	1	9:09:04	12/3/2001	39.8	2.0	37.8	7634380.1	696780.9	45.556513	-122.716666	2200	8.7	1.3	6	2
63b	2	9:09:43	12/3/2001	39.7	2.0	37.7	7634376.0	696777.6	45.556504	-122.716682	2201	8.7	1.3	6	2
63b	3	9:10:22	12/3/2001	39.7	2.0	37.7	7634373.8	696775.8	45.556499	-122.716690	2206	8.4	1.6	5	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
63c	1	9:14:51	12/3/2001	66.7	2.0	64.7	7634925.8	697465.7	45.558432	-122.714610	2207	8.7	1.3	7	2
63c	2	9:15:32	12/3/2001	67.1	2.0	65.1	7634923.9	697461.7	45.558421	-122.714617	2212	8.4	1.6	6	2
63c	3	9:16:16	12/3/2001	66.9	2.0	64.9	7634931.5	697460.1	45.558417	-122.714587	2213	8.4	1.6	6	2
63d	1	9:20:10	12/3/2001	25.9	2.0	23.9	7635083.4	697667.0	45.558996	-122.714016	2218	8.7	1.3	7	2
63d	2	9:20:53	12/3/2001	27.0	2.0	25.0	7635079.0	697660.8	45.558978	-122.714033	2219	8.8	1.2	8	2
63d	3	9:21:37	12/3/2001	27.4	2.0	25.4	7635074.6	697659.5	45.558974	-122.714050	2224	8.8	1.2	8	2
64d	1	9:26:09	12/3/2001	9.7	2.0	7.7	7635561.4	697350.5	45.558164	-122.712117	2225	8.9	1.1	8	2
64d	2	9:27:04	12/3/2001	10.0	2.0	8.0	7635560.7	697349.9	45.558162	-122.712120	2230	8.7	1.3	7	2
64d	3	9:27:42	12/3/2001	11.2	2.0	9.2	7635562.9	697341.7	45.558140	-122.712110	2231	8.7	1.3	7	2
64c	1	9:30:23	12/3/2001	47.3	2.0	45.3	7635488.4	697226.3	45.557818	-122.712389	2236	8.7	1.3	7	2
64c	2	9:31:11	12/3/2001	47.3	2.0	45.3	7635494.3	697222.0	45.557806	-122.712365	2237	8.8	1.2	7	2
64c	3	9:31:51	12/3/2001	47.4	2.0	45.4	7635494.5	697215.8	45.557790	-122.712364	2242	8.8	1.2	7	2
64b	1	9:36:10	12/3/2001	49.4	2.0	47.4	7635103.4	696674.4	45.556276	-122.713832	2243	8.8	1.2	7	2
64b	2	9:37:00	12/3/2001	49.4	2.0	47.4	7635096.3	696675.4	45.556278	-122.713860	2248	8.8	1.2	7	2
64b	3	9:37:39	12/3/2001	49.5	2.0	47.5	7635091.1	696673.9	45.556273	-122.713880	2249	8.8	1.2	7	2
64a	1	9:42:05	12/3/2001	34.6	2.0	32.6	7634691.8	696088.8	45.554639	-122.715376	2254	8.0	2.0	5	2
64a	2	9:42:42	12/3/2001	34.7	2.0	32.7	7634692.8	696087.2	45.554635	-122.715372	2255	8.0	2.0	5	2
64a	3	9:43:21	12/3/2001	34.6	2.0	32.6	7634692.4	696085.3	45.554630	-122.715373	2260	8.0	2.0	5	2
65a	1	9:49:56	12/3/2001	19.4	2.0	17.4	7635215.7	695719.3	45.553666	-122.713292	2261	8.9	1.1	8	2
65a	2	9:50:36	12/3/2001	18.7	2.0	16.7	7635218.4	695717.0	45.553659	-122.713281	2266	8.9	1.1	9	2
65a	3	9:51:10	12/3/2001	18.6	1.9	16.7	7635218.2	695714.1	45.553652	-122.713281	2267	8.9	1.1	8	2
65b	1	9:55:05	12/3/2001	27.4	1.9	25.5	7635358.9	695953.1	45.554317	-122.712758	2272	9.0	1.0	9	2
65b	2	9:55:42	12/3/2001	27.4	1.9	25.5	7635358.5	695952.8	45.554317	-122.712760	2273	9.0	1.0	9	2
65b	3	9:56:20	12/3/2001	27.4	1.9	25.5	7635359.6	695950.8	45.554311	-122.712755	2278	9.0	1.0	9	2
65c	1	10:01:20	12/3/2001	53.7	1.9	51.8	7635747.1	696629.0	45.556200	-122.711315	2279	8.9	1.1	8	2
65c	2	10:02:04	12/3/2001	53.5	1.9	51.6	7635739.6	696629.7	45.556201	-122.711344	2284	8.9	1.1	8	2
65c	3	10:02:45	12/3/2001	53.8	1.9	51.9	7635748.3	696625.3	45.556189	-122.711310	2285	8.9	1.1	8	2
65d	1	10:07:48	12/3/2001	14.0	1.9	12.1	7636008.6	697038.4	45.557342	-122.710338	2289	8.9	1.1	8	2
65d	2	10:08:34	12/3/2001	11.9	1.9	10.0	7636004.3	697043.4	45.557355	-122.710356	2290	8.9	1.1	8	2
65d	3	10:09:13	12/3/2001	13.2	1.9	11.3	7636006.2	697040.0	45.557346	-122.710348	2295	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
66f	1	10:13:19	12/3/2001	9.0	1.9	7.1	7636604.3	696780.4	45.556679	-122.707986	2296	8.9	1.1	8	2
66f	2	10:13:55	12/3/2001	9.8	1.9	7.9	7636609.3	696777.2	45.556670	-122.707966	2301	8.5	1.5	7	2
66f	3	10:14:41	12/3/2001	9.8	1.9	7.9	7636610.5	696775.6	45.556666	-122.707962	2302	8.5	1.5	7	2
66e	1	10:19:14	12/3/2001	23.4	1.9	21.5	7636552.0	696706.2	45.556472	-122.708182	2307	8.9	1.1	8	2
66e	2	10:19:55	12/3/2001	25.4	1.9	23.5	7636548.2	696701.5	45.556459	-122.708197	2308	8.5	1.5	7	2
66e	3	10:20:33	12/3/2001	26.3	1.9	24.4	7636549.3	696697.5	45.556448	-122.708192	2313	8.5	1.5	7	2
66d	1	10:24:21	12/3/2001	46.3	1.9	44.4	7636466.1	696561.2	45.556068	-122.708502	2314	8.9	1.1	8	2
66d	2	10:24:58	12/3/2001	46.3	1.9	44.4	7636463.2	696563.4	45.556074	-122.708514	2319	8.9	1.1	8	2
66d	3	10:25:35	12/3/2001	46.8	1.9	44.9	7636457.2	696560.4	45.556065	-122.708537	2320	8.9	1.1	8	2
66c	1	10:28:45	12/3/2001	54.9	1.8	53.1	7636169.4	696087.6	45.554747	-122.709609	2325	8.6	1.4	7	2
66c	2	10:29:23	12/3/2001	54.8	1.8	53.0	7636164.2	696086.9	45.554745	-122.709630	2326	8.6	1.4	7	2
66c	3	10:30:07	12/3/2001	54.7	1.8	52.9	7636163.5	696086.7	45.554744	-122.709633	2331	8.6	1.4	7	2
66b	1	10:33:51	12/3/2001	22.5	1.8	20.7	7635896.7	695658.2	45.553549	-122.710628	2332	9.1	0.9	9	2
66b	2	10:34:28	12/3/2001	23.1	1.8	21.3	7635895.1	695659.2	45.553552	-122.710634	2337	9.1	0.9	9	2
66b	3	10:35:06	12/3/2001	23.2	1.8	21.4	7635896.6	695657.2	45.553546	-122.710628	2338	9.1	0.9	9	2
66a	1	10:38:55	12/3/2001	29.8	1.8	28.0	7635789.8	695475.0	45.553039	-122.711025	2343	8.4	1.6	7	2
66a	2	10:39:36	12/3/2001	29.8	1.8	28.0	7635788.5	695475.7	45.553041	-122.711031	2344	8.4	1.6	7	2
66a	3	10:40:14	12/3/2001	29.8	1.8	28.0	7635785.6	695479.8	45.553052	-122.711042	2349	8.4	1.6	7	2
67a	1	10:45:25	12/3/2001	27.9	1.8	26.1	7636367.0	695131.4	45.552140	-122.708736	2350	8.7	1.3	7	2
67a	2	10:46:04	12/3/2001	27.9	1.8	26.1	7636368.8	695130.8	45.552139	-122.708729	2355	8.9	1.1	8	2
67a	3	10:46:51	12/3/2001	28.5	1.8	26.7	7636368.5	695134.4	45.552149	-122.708731	2356	8.9	1.1	8	2
67b	1	10:49:28	12/3/2001	21.7	1.8	19.9	7636478.8	695290.2	45.552584	-122.708317	2361	9.1	0.9	9	2
67b	2	10:50:12	12/3/2001	21.5	1.8	19.7	7636474.5	695293.1	45.552592	-122.708334	2362	9.1	0.9	9	2
67b	3	10:50:49	12/3/2001	21.6	1.8	19.8	7636473.6	695293.6	45.552593	-122.708338	2366	9.1	0.9	9	2
67c	1	10:59:53	12/3/2001	44.4	1.7	42.7	7636598.9	695511.0	45.553198	-122.707872	2377	9.1	0.9	9	2
67c	2	11:00:34	12/3/2001	44.8	1.7	43.1	7636602.0	695511.0	45.553199	-122.707860	2378	9.1	0.9	9	2
67c	3	11:01:16	12/3/2001	44.5	1.7	42.8	7636604.1	695507.8	45.553190	-122.707851	2383	9.1	0.9	9	2
67d	1	11:07:11	12/3/2001	82.4	1.7	80.7	7636883.4	695972.0	45.554484	-122.706811	2384	9.1	0.9	9	2
67d	2	11:07:59	12/3/2001	82.5	1.7	80.8	7636878.4	695979.9	45.554505	-122.706831	2389	9.1	0.9	9	2
67d	3	11:08:55	12/3/2001	82.5	1.7	80.8	7636871.1	695972.8	45.554485	-122.706859	2390	9.1	0.9	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
67e	1	11:14:10	12/3/2001	20.8	1.7	19.1	7637109.6	696347.0	45.555529	-122.705968	2395	9.1	0.9	9	2
67e	2	11:14:56	12/3/2001	20.2	1.7	18.5	7637105.8	696347.7	45.555530	-122.705983	2396	9.1	0.9	9	2
67e	3	11:15:40	12/3/2001	19.9	1.7	18.2	7637112.5	696348.0	45.555532	-122.705957	2401	9.1	0.9	9	2
68e	1	11:19:47	12/3/2001	11.0	1.7	9.3	7637668.6	696036.2	45.554718	-122.703753	2402	9.1	0.9	9	2
68e	2	11:20:31	12/3/2001	11.6	1.7	9.9	7637664.2	696036.3	45.554718	-122.703771	2407	9.1	0.9	9	2
68e	3	11:21:13	12/3/2001	15.7	1.7	14.0	7637657.0	696030.7	45.554702	-122.703798	2408	9.1	0.9	9	2
68d	1	11:24:55	12/3/2001	46.5	1.7	44.8	7637581.6	695884.7	45.554297	-122.704077	2413	9.0	1.0	9	2
68d	2	11:25:35	12/3/2001	46.4	1.7	44.7	7637576.8	695887.5	45.554304	-122.704096	2414	9.0	1.0	9	2
68d	3	11:26:15	12/3/2001	46.9	1.6	45.3	7637573.0	695884.7	45.554296	-122.704110	2419	9.0	1.0	9	2
68c	1	11:30:13	12/3/2001	61.0	1.6	59.4	7637291.4	695384.0	45.552902	-122.705156	2420	9.0	1.0	9	2
68c	2	11:31:01	12/3/2001	61.2	1.6	59.6	7637287.1	695384.8	45.552904	-122.705173	2425	9.0	1.0	9	2
68c	3	11:31:40	12/3/2001	61.0	1.6	59.4	7637281.4	695383.4	45.552900	-122.705195	2426	9.0	1.0	9	2
68b	1	11:36:45	12/3/2001	26.4	1.6	24.8	7636982.5	694868.2	45.551465	-122.706307	2431	9.0	1.0	9	2
68b	2	11:38:12	12/3/2001	27.4	1.6	25.8	7636980.2	694877.2	45.551489	-122.706316	2432	8.9	1.1	8	2
68b	3	11:40:26	12/3/2001	26.6	1.6	25.0	7636972.4	694880.3	45.551497	-122.706347	2438	8.9	1.1	8	2
68a	1	11:43:18	12/3/2001	24.7	1.6	23.1	7636930.4	694806.1	45.551291	-122.706503	2443	9.0	1.0	9	2
68a	2	11:43:58	12/3/2001	24.6	1.6	23.0	7636929.9	694806.9	45.551293	-122.706505	2444	9.0	1.0	9	2
68a	3	11:44:39	12/3/2001	24.8	1.6	23.2	7636936.2	694803.2	45.551283	-122.706480	2448	9.0	1.0	9	2
69a	1	11:50:45	12/3/2001	9.9	1.6	8.3	7637327.6	694183.9	45.549615	-122.704887	2449	8.9	1.1	8	2
69a	2	11:51:32	12/3/2001	10.7	1.6	9.1	7637333.3	694184.6	45.549617	-122.704865	2454	8.9	1.1	8	2
69a	3	11:52:09	12/3/2001	10.7	1.5	9.2	7637334.8	694184.3	45.549616	-122.704859	2455	8.7	1.3	7	2
69b	1	11:55:40	12/3/2001	23.1	1.5	21.6	7637424.9	694331.8	45.550027	-122.704523	2459	8.9	1.1	8	2
69b	2	11:56:21	12/3/2001	22.9	1.5	21.4	7637426.0	694327.1	45.550014	-122.704518	2460	8.9	1.1	8	2
69b	3	11:57:04	12/3/2001	23.1	1.5	21.6	7637426.5	694332.4	45.550029	-122.704517	2465	8.9	1.1	8	2
69c	1	12:59:59	12/3/2001	34.2	1.3	32.9	7637570.9	694542.7	45.550616	-122.703976	2466	9.1	0.9	9	2
69c	2	13:00:55	12/3/2001	31.6	1.3	30.3	7637561.6	694538.6	45.550605	-122.704012	2471	8.5	1.5	7	2
69c	3	13:01:36	12/3/2001	31.3	1.3	30.0	7637554.5	694537.5	45.550601	-122.704039	2472	8.5	1.5	7	2
69d	1	13:06:59	12/3/2001	80.7	1.3	79.4	7637991.9	695259.7	45.552614	-122.702409	2477	9.0	1.0	8	2
69d	2	13:08:14	12/3/2001	80.9	1.3	79.6	7638001.5	695261.5	45.552619	-122.702372	2478	9.0	1.0	8	2
69d	3	13:09:06	12/3/2001	80.8	1.2	79.6	7638003.3	695258.8	45.552612	-122.702365	2483	8.9	1.1	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
69e	1	13:13:01	12/3/2001	16.3	1.2	15.1	7638252.1	695647.1	45.553695	-122.701435	2484	8.9	1.1	8	2
69e	2	13:13:41	12/3/2001	16.9	1.2	15.7	7638255.3	695643.1	45.553684	-122.701422	2489	8.9	1.1	8	2
69e	3	13:14:24	12/3/2001	17.0	1.2	15.8	7638252.8	695643.9	45.553686	-122.701432	2490	8.9	1.1	8	2
70d	1	13:22:26	12/3/2001	15.2	1.2	14.0	7639668.0	694972.9	45.551952	-122.695838	2495	8.9	1.1	7	2
70d	2	13:23:12	12/3/2001	17.1	1.2	15.9	7639663.6	694973.7	45.551954	-122.695855	2499	8.9	1.1	7	2
70d	3	13:23:50	12/3/2001	19.2	1.2	18.0	7639661.3	694975.8	45.551960	-122.695864	2502	8.9	1.1	7	2
70c	1	13:29:04	12/3/2001	34.4	1.2	33.2	7639608.9	694894.7	45.551734	-122.696060	2503	8.9	1.1	8	2
70c	2	13:29:57	12/3/2001	34.5	1.2	33.3	7639613.7	694893.5	45.551731	-122.696041	2506	8.9	1.1	8	2
70c	3	13:30:47	12/3/2001	34.5	1.2	33.3	7639622.1	694901.6	45.551754	-122.696010	2508	8.7	1.3	7	2
70b	1	13:43:07	12/3/2001	49.0	1.2	47.8	7638901.3	694142.0	45.549617	-122.698742	2513	8.7	1.3	7	2
70b	2	13:43:48	12/3/2001	49.1	1.2	47.9	7638897.7	694141.9	45.549617	-122.698756	2514	8.7	1.3	7	2
70b	3	13:44:28	12/3/2001	49.1	1.1	48.0	7638904.0	694140.1	45.549612	-122.698731	2519	8.7	1.3	7	2
70a	1	13:56:20	12/3/2001	45.7	1.1	44.6	7638623.9	693834.5	45.548754	-122.699792	2531	8.7	1.3	7	2
70a	2	13:57:02	12/3/2001	45.6	1.1	44.5	7638626.1	693833.0	45.548749	-122.699783	2532	8.7	1.3	7	2
70a	3	13:57:43	12/3/2001	45.5	1.1	44.4	7638626.8	693834.2	45.548753	-122.699780	2536	8.7	1.3	7	2
71a	1	14:02:58	12/3/2001	49.4	1.1	48.3	7639670.7	693019.1	45.546596	-122.695620	2537	8.7	1.3	7	2
71a	2	14:04:19	12/3/2001	49.2	1.1	48.1	7639672.0	693012.7	45.546578	-122.695615	2542	8.7	1.3	7	2
71a	3	14:05:08	12/3/2001	49.2	1.1	48.1	7639666.1	693020.1	45.546598	-122.695638	2543	8.7	1.3	7	2
71b	1	14:08:58	12/3/2001	48.4	1.1	47.3	7640283.3	693564.6	45.548137	-122.693288	2548	8.7	1.3	7	2
71b	2	14:09:59	12/3/2001	49.1	1.1	48.0	7640287.0	693580.5	45.548181	-122.693275	2549	8.7	1.3	7	2
71b	3	14:10:58	12/3/2001	49.0	1.1	47.9	7640286.8	693576.4	45.548170	-122.693275	2554	8.7	1.3	7	2
71c	1	14:16:02	12/3/2001	13.8	1.1	12.7	7640422.1	693696.2	45.548508	-122.692760	2555	8.4	1.6	6	2
71c	2	14:19:01	12/3/2001	13.8	1.1	12.7	7640409.2	693714.1	45.548556	-122.692812	2560	8.7	1.3	7	2
71c	3	14:19:52	12/3/2001	13.8	1.1	12.7	7640404.8	693702.5	45.548524	-122.692828	2561	8.7	1.3	7	2
72c	1	14:28:39	12/3/2001	24.7	1.1	23.6	7641127.8	692578.6	45.545497	-122.689888	2564	8.7	1.3	7	2
72c	2	14:33:39	12/3/2001	24.8	1.1	23.7	7641133.1	692579.4	45.545499	-122.689868	2572	8.5	1.5	6	2
72c	3	14:34:37	12/3/2001	25.4	1.1	24.3	7641130.9	692576.9	45.545492	-122.689876	2573	8.5	1.5	6	2
72b	1	14:40:40	12/3/2001	61.3	1.1	60.2	7640747.7	692256.4	45.544585	-122.691337	2578	8.5	1.5	6	2
72b	2	14:41:24	12/3/2001	61.4	1.0	60.4	7640750.3	692254.8	45.544581	-122.691327	2579	8.5	1.5	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
72b	3	14:42:10	12/3/2001	61.7	1.0	60.7	7640748.0	692248.6	45.544564	-122.691335	2584	8.5	1.5	6	2
72a	1	14:47:33	12/3/2001	41.3	1.0	40.3	7640268.6	692033.0	45.543937	-122.693183	2585	8.8	1.2	7	2
72a	2	14:48:17	12/3/2001	42.2	1.0	41.2	7640266.4	692041.7	45.543961	-122.693193	2590	8.8	1.2	7	2
72a	3	14:49:00	12/3/2001	41.6	1.0	40.6	7640265.1	692047.7	45.543977	-122.693198	2591	8.8	1.2	7	2
73a	1	14:56:56	12/3/2001	17.5	1.0	16.5	7641130.5	690788.8	45.540590	-122.689688	2596	8.8	1.2	7	2
73a	2	14:57:40	12/3/2001	17.3	1.0	16.3	7641130.7	690785.7	45.540581	-122.689687	2597	8.8	1.2	7	2
73a	3	14:58:21	12/3/2001	16.5	1.0	15.5	7641127.6	690778.6	45.540562	-122.689699	2601	8.8	1.2	7	2
73b	1	15:03:08	12/3/2001	35.0	1.0	34.0	7641219.4	690863.8	45.540802	-122.689349	2602	8.9	1.1	7	2
73b	2	15:03:54	12/3/2001	34.3	1.0	33.3	7641217.8	690870.2	45.540820	-122.689356	2607	8.9	1.1	7	2
73b	3	15:04:37	12/3/2001	34.4	1.0	33.4	7641216.7	690865.6	45.540807	-122.689360	2608	8.9	1.1	7	2
73c	1	15:09:14	12/3/2001	52.2	1.0	51.2	7641744.0	691382.2	45.542263	-122.687358	2613	9.1	0.9	8	2
73c	2	15:09:59	12/3/2001	52.2	1.0	51.2	7641744.8	691383.8	45.542267	-122.687355	2614	9.1	0.9	8	2
73c	3	15:10:49	12/3/2001	52.2	1.0	51.2	7641739.7	691383.9	45.542267	-122.687374	2619	9.1	0.9	8	2
73d	1	15:14:30	12/3/2001	20.9	0.9	20.0	7641940.4	691549.2	45.542735	-122.686609	2620	8.8	1.2	7	2
73d	2	15:15:12	12/3/2001	21.1	0.9	20.2	7641942.5	691544.5	45.542722	-122.686600	2624	8.8	1.2	7	2
73d	3	15:15:51	12/3/2001	21.2	0.9	20.3	7641941.3	691544.1	45.542721	-122.686605	2625	8.8	1.2	7	2
74d	1	15:21:37	12/3/2001	15.6	0.9	14.7	7642762.6	690500.5	45.539921	-122.683290	2630	9.0	1.0	7	2
74d	2	15:22:23	12/3/2001	19.2	0.9	18.3	7642758.5	690494.7	45.539905	-122.683306	2631	9.0	1.0	7	2
74d	3	15:23:23	12/3/2001	24.9	0.9	24.0	7642756.6	690487.0	45.539883	-122.683312	2639	9.1	0.9	8	2
74c	1	15:28:46	12/3/2001	48.4	0.9	47.5	7642661.1	690423.9	45.539703	-122.683678	2645	9.0	1.0	7	2
74c	2	15:29:42	12/3/2001	49.0	0.9	48.1	7642661.5	690416.9	45.539684	-122.683676	2646	9.1	0.9	8	2
74c	3	15:30:32	12/3/2001	49.1	0.9	48.2	7642668.2	690416.4	45.539683	-122.683650	2651	9.0	1.0	7	2
74b	1	15:34:22	12/3/2001	59.1	0.9	58.2	7642317.8	690102.8	45.538797	-122.684984	2652	9.1	0.9	8	2
74b	2	15:35:05	12/3/2001	59.0	0.9	58.1	7642312.5	690106.1	45.538806	-122.685005	2657	9.1	0.9	8	2
74b	3	15:35:57	12/3/2001	59.3	0.9	58.4	7642309.2	690111.0	45.538819	-122.685018	2658	9.1	0.9	8	2
74a	1	15:39:22	12/3/2001	31.5	0.9	30.6	7642103.8	689890.5	45.538199	-122.685796	2663	8.5	1.5	5	2
74a	2	15:41:03	12/3/2001	30.9	0.9	30.0	7642098.5	689891.7	45.538202	-122.685817	2669	8.9	1.1	8	2
74a	3	15:42:43	12/3/2001	30.8	0.9	29.9	7642102.5	689888.8	45.538195	-122.685801	2675	9.1	0.9	8	2
75a	1	15:49:33	12/3/2001	14.7	0.9	13.8	7642983.9	688958.7	45.535710	-122.682264	2676	8.6	1.4	6	2
75a	2	15:51:00	12/3/2001	15.2	0.9	14.3	7642986.5	688957.7	45.535708	-122.682254	2684	8.6	1.4	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
75a	3	15:57:00	12/3/2001	14.2	0.9	13.3	7642986.6	688954.6	45.535699	-122.682254	2696	8.8	1.2	7	2
75b	1	16:29:13	12/3/2001	33.4	0.9	32.5	7643069.1	689029.3	45.535910	-122.681939	2696	8.7	1.3	7	2
75b	2	16:29:55	12/3/2001	34.3	0.9	33.4	7643066.7	689036.6	45.535930	-122.681950	2701	8.7	1.3	7	2
75b	3	16:30:41	12/3/2001	34.2	0.9	33.3	7643062.4	689037.0	45.535930	-122.681966	2702	8.8	1.2	7	2
75c	1	16:38:25	12/3/2001	53.1	1.0	52.1	7643405.8	689367.5	45.536862	-122.680661	2707	8.7	1.3	6	2
75c	2	16:39:13	12/3/2001	53.0	1.0	52.0	7643410.2	689363.1	45.536850	-122.680644	2708	8.7	1.3	6	2
75c	3	16:40:11	12/3/2001	53.6	1.0	52.6	7643393.4	689363.0	45.536849	-122.680709	2713	8.7	1.3	6	2
75d	1	16:47:55	12/3/2001	45.7	1.0	44.7	7643708.6	689620.1	45.537577	-122.679507	2719	8.7	1.3	6	2
75d	2	16:48:38	12/3/2001	46.4	1.0	45.4	7643705.9	689620.0	45.537576	-122.679517	2720	8.7	1.3	6	2
75d	3	16:49:25	12/3/2001	46.9	1.0	45.9	7643700.5	689622.0	45.537582	-122.679539	2725	8.7	1.3	6	2
75e	1	16:57:05	12/3/2001	25.1	1.1	24.0	7643771.7	689670.0	45.537719	-122.679266	2734	8.6	1.4	5	2
75e	2	16:57:54	12/3/2001	25.1	1.1	24.0	7643772.3	689668.1	45.537713	-122.679264	2735	8.6	1.4	5	2
75e	3	16:58:42	12/3/2001	26.0	1.1	24.9	7643768.0	689665.6	45.537706	-122.679280	2740	8.6	1.4	5	2
76a	1	17:07:28	12/3/2001	20.5	1.2	19.3	7643960.5	688085.1	45.533387	-122.678363	2741	8.6	1.4	6	2
76a	2	17:08:16	12/3/2001	19.6	1.2	18.4	7643955.2	688083.2	45.533381	-122.678383	2746	8.6	1.4	6	2
76a	3	17:08:58	12/3/2001	18.3	1.2	17.1	7643954.9	688079.0	45.533370	-122.678384	2747	8.6	1.4	6	2
76b	1	8:35:21	12/4/2001	65.1	1.9	63.2	7644630.8	688651.6	45.534990	-122.675807	2755	8.5	1.5	6	2
76b	2	8:36:03	12/4/2001	66.2	1.9	64.3	7644630.0	688643.0	45.534966	-122.675810	2756	8.5	1.5	6	2
76b	3	8:36:46	12/4/2001	66.1	1.9	64.2	7644628.7	688640.7	45.534960	-122.675814	2761	8.5	1.5	6	2
76c	1	8:43:58	12/4/2001	29.4	1.9	27.5	7644849.1	688535.6	45.534688	-122.674944	2767	8.2	1.8	4	2
76c	2	8:45:15	12/4/2001	31.4	1.9	29.5	7644847.4	688535.6	45.534688	-122.674950	2773	8.2	1.8	4	2
76c	3	8:46:21	12/4/2001	32.0	2.0	30.0	7644853.4	688534.2	45.534684	-122.674927	2782	8.2	1.8	4	2
77d	1	8:54:40	12/4/2001	32.6	2.0	30.6	7645412.7	687567.2	45.532075	-122.672643	2783	8.4	1.6	5	2
77d	2	8:55:22	12/4/2001	31.4	2.0	29.4	7645415.7	687564.7	45.532068	-122.672631	2787	8.8	1.2	6	2
77d	3	8:59:19	12/4/2001	33.8	2.0	31.8	7645399.7	687574.4	45.532093	-122.672695	2796	8.8	1.2	6	2
77c	1	9:04:17	12/4/2001	55.2	2.0	53.2	7645134.8	687377.5	45.531534	-122.673707	2797	8.8	1.2	6	2
77c	2	9:05:09	12/4/2001	54.9	2.0	52.9	7645127.6	687385.1	45.531554	-122.673736	2802	8.8	1.2	6	2
77c	3	9:05:55	12/4/2001	54.9	2.0	52.9	7645117.2	687379.4	45.531538	-122.673776	2803	8.8	1.2	6	2
77b	1	9:10:38	12/4/2001	53.3	2.0	51.3	7644886.7	687194.3	45.531013	-122.674656	2808	8.8	1.2	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
77b	2	9:11:19	12/4/2001	52.9	2.0	50.9	7644887.9	687198.1	45.531024	-122.674652	2809	8.4	1.6	5	2
77b	3	9:12:01	12/4/2001	53.1	2.0	51.1	7644888.9	687193.6	45.531011	-122.674647	2814	8.4	1.6	5	2
77a	1	9:16:44	12/4/2001	42.3	2.0	40.3	7644848.0	687154.9	45.530903	-122.674803	2815	8.4	1.6	6	2
77a	2	9:17:27	12/4/2001	43.2	2.0	41.2	7644852.5	687153.2	45.530898	-122.674785	2820	8.4	1.6	6	2
77a	3	9:18:09	12/4/2001	43.4	2.0	41.4	7644850.8	687156.4	45.530907	-122.674792	2821	8.4	1.6	6	2
78a	1	9:28:50	12/4/2001	16.2	2.0	14.2	7645662.8	686071.9	45.527993	-122.671511	2826	8.8	1.2	7	2
78a	2	9:29:32	12/4/2001	16.9	2.0	14.9	7645659.6	686075.0	45.528002	-122.671524	2827	8.8	1.2	7	2
78a	3	9:30:12	12/4/2001	16.9	2.0	14.9	7645658.6	686073.2	45.527996	-122.671527	2832	8.8	1.2	7	2
78b	1	9:40:34	12/4/2001	56.0	2.0	54.0	7645812.1	686188.5	45.528324	-122.670941	2833	8.9	1.1	9	2
78b	2	9:41:25	12/4/2001	56.0	2.0	54.0	7645812.3	686182.5	45.528308	-122.670939	2838	8.9	1.1	8	2
78b	3	9:42:12	12/4/2001	56.1	2.0	54.1	7645815.5	686172.0	45.528279	-122.670926	2839	8.9	1.1	9	2
78c	1	9:47:10	12/4/2001	71.7	2.0	69.7	7645938.6	686274.9	45.528570	-122.670456	2844	8.9	1.1	9	2
78c	2	9:47:56	12/4/2001	71.6	2.0	69.6	7645930.9	686277.4	45.528576	-122.670486	2845	8.9	1.1	9	2
78c	3	9:48:51	12/4/2001	70.7	2.0	68.7	7645922.8	686278.3	45.528578	-122.670518	2850	8.9	1.1	9	2
78d	1	9:53:57	12/4/2001	63.6	2.0	61.6	7646158.3	686429.4	45.529010	-122.669615	2851	7.6	2.4	7	2
78d	2	9:55:48	12/4/2001	51.4	2.0	49.4	7646173.2	686428.7	45.529009	-122.669557	2856	7.4	2.6	6	2
78d	3	9:56:32	12/4/2001	51.2	2.0	49.2	7646172.9	686431.0	45.529015	-122.669559	2857	7.4	2.6	6	2
79c	1	10:28:32	12/4/2001	37.0	2.0	35.0	7647005.6	685377.0	45.526187	-122.666200	2870	8.6	1.4	7	2
79c	2	10:29:15	12/4/2001	36.2	2.0	34.2	7647004.8	685371.2	45.526171	-122.666203	2875	8.9	1.1	8	2
79c	3	10:30:03	12/4/2001	37.3	2.0	35.3	7647001.3	685372.8	45.526175	-122.666216	2876	9.1	0.9	9	2
79d	1	10:34:01	12/4/2001	19.9	2.0	17.9	7647060.6	685405.0	45.526268	-122.665989	2881	9.1	0.9	9	2
79d	2	10:34:58	12/4/2001	20.3	2.0	18.3	7647060.6	685395.9	45.526243	-122.665988	2882	9.1	0.9	9	2
79d	3	10:36:07	12/4/2001	21.3	2.0	19.3	7647058.8	685389.2	45.526224	-122.665994	2887	9.1	0.9	9	2
79b	1	10:50:39	12/4/2001	47.7	1.9	45.8	7646320.2	685041.5	45.525217	-122.668839	2896	9.1	0.9	9	2
79b	2	10:51:46	12/4/2001	45.7	1.9	43.8	7646316.7	685045.8	45.525228	-122.668853	2897	9.1	0.9	9	2
79b	3	10:52:45	12/4/2001	46.5	1.9	44.6	7646318.1	685046.4	45.525230	-122.668847	2902	8.8	1.2	8	2
79a	1	10:57:04	12/4/2001	36.6	1.9	34.7	7646158.0	684955.2	45.524968	-122.669462	2903	9.1	0.9	9	2
79a	2	10:57:50	12/4/2001	37.0	1.9	35.1	7646161.3	684959.1	45.524979	-122.669450	2908	9.1	0.9	9	2
79a	3	10:58:56	12/4/2001	36.3	1.9	34.4	7646157.0	684957.0	45.524973	-122.669466	2909	9.1	0.9	9	2
80a	1	11:05:32	12/4/2001	37.9	1.9	36.0	7646174.6	683859.3	45.521965	-122.669283	2914	9.1	0.9	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
80a	2	11:06:18	12/4/2001	37.9	1.9	36.0	7646174.1	683859.5	45.521965	-122.669285	2915	9.1	0.9	9	2
80a	3	11:07:08	12/4/2001	37.2	1.9	35.3	7646176.9	683863.1	45.521975	-122.669274	2920	9.1	0.9	9	2
80b	1	11:12:10	12/4/2001	39.4	1.9	37.5	7646241.0	683868.5	45.521995	-122.669025	2921	9.1	0.9	9	2
80b	2	11:12:59	12/4/2001	39.4	1.9	37.5	7646238.8	683875.1	45.522013	-122.669034	2926	9.1	0.9	9	2
80b	3	11:13:50	12/4/2001	38.9	1.9	37.0	7646238.3	683880.4	45.522027	-122.669036	2927	9.1	0.9	9	2
80c	1	11:19:41	12/4/2001	55.2	1.8	53.4	7646712.7	683816.5	45.521887	-122.667179	2932	9.0	1.0	9	2
80c	2	11:20:21	12/4/2001	54.5	1.8	52.7	7646703.6	683818.4	45.521891	-122.667215	2933	9.0	1.0	9	2
80c	3	11:21:26	12/4/2001	54.3	1.8	52.5	7646701.3	683817.0	45.521888	-122.667224	2938	9.0	1.0	9	2
80d	1	11:24:46	12/4/2001	31.4	1.8	29.6	7646911.5	683778.2	45.521797	-122.666400	2939	9.0	1.0	9	2
80d	2	11:25:26	12/4/2001	29.6	1.8	27.8	7646910.7	683766.7	45.521765	-122.666402	2944	8.8	1.2	8	2
80d	3	11:26:13	12/4/2001	29.8	1.8	28.0	7646907.7	683765.2	45.521761	-122.666414	2945	8.8	1.2	8	2
81d	1	11:35:09	12/4/2001	29.5	1.8	27.7	7646571.3	682477.6	45.518206	-122.667591	2950	9.0	1.0	9	2
81d	2	11:35:48	12/4/2001	29.9	1.8	28.1	7646569.5	682477.1	45.518204	-122.667598	2951	8.7	1.3	7	2
81d	3	11:36:31	12/4/2001	30.6	1.8	28.8	7646571.2	682485.8	45.518228	-122.667592	2956	8.8	1.2	8	2
81c	1	11:40:46	12/4/2001	41.2	1.8	39.4	7646481.4	682508.7	45.518284	-122.667945	2962	8.9	1.1	8	2
81c	2	11:41:41	12/4/2001	40.9	1.8	39.1	7646475.1	682498.7	45.518257	-122.667968	2963	8.7	1.3	7	2
81c	3	11:42:26	12/4/2001	41.2	1.8	39.4	7646478.3	682510.5	45.518289	-122.667957	2968	8.7	1.3	7	2
81b	1	11:47:08	12/4/2001	40.6	1.8	38.8	7645800.6	682693.6	45.518741	-122.670619	2969	8.7	1.3	7	2
81b	2	11:47:54	12/4/2001	41.5	1.8	39.7	7645806.9	682700.3	45.518760	-122.670595	2974	8.7	1.3	7	2
81b	3	11:48:37	12/4/2001	41.9	1.7	40.2	7645807.1	682696.6	45.518750	-122.670594	2975	8.7	1.3	7	2
81a	1	11:52:18	12/4/2001	38.0	1.7	36.3	7645765.1	682709.6	45.518782	-122.670759	2980	8.7	1.3	7	2
81a	2	11:53:02	12/4/2001	37.7	1.7	36.0	7645767.6	682713.1	45.518792	-122.670750	2981	8.9	1.1	8	2
81a	3	11:53:45	12/4/2001	37.6	1.7	35.9	7645766.8	682705.1	45.518770	-122.670752	2986	8.9	1.1	8	2
82d	1	12:09:21	12/4/2001	8.3	1.7	6.6	7646298.0	681213.2	45.514719	-122.668524	2987	8.7	1.3	7	2
82d	2	12:10:02	12/4/2001	10.1	1.7	8.4	7646300.6	681215.1	45.514725	-122.668514	2992	8.7	1.3	7	2
82d	3	12:10:43	12/4/2001	9.3	1.7	7.6	7646298.9	681210.9	45.514713	-122.668521	2993	8.7	1.3	7	2
82c	1	12:15:26	12/4/2001	30.9	1.7	29.2	7646254.9	681236.3	45.514779	-122.668695	2998	8.7	1.3	7	2
82c	2	12:16:08	12/4/2001	30.7	1.6	29.1	7646257.3	681236.3	45.514779	-122.668686	2999	8.7	1.3	7	2
82c	3	12:16:48	12/4/2001	29.3	1.6	27.7	7646259.6	681238.4	45.514785	-122.668677	3004	8.7	1.3	7	2
82b	1	12:22:00	12/4/2001	40.5	1.6	38.9	7645642.6	681400.1	45.515183	-122.671100	3005	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
82b	2	12:23:11	12/4/2001	41.6	1.6	40.0	7645630.3	681404.0	45.515193	-122.671148	3009	8.7	1.3	7	2
82b	3	12:23:55	12/4/2001	41.5	1.6	39.9	7645634.7	681409.7	45.515209	-122.671132	3010	8.7	1.3	7	2
82a	1	12:26:55	12/4/2001	40.9	1.6	39.3	7645304.2	681479.9	45.515377	-122.672428	3014	8.7	1.3	7	2
82a	2	12:27:40	12/4/2001	40.2	1.6	38.6	7645302.2	681485.1	45.515391	-122.672436	3015	8.7	1.3	7	2
82a	3	12:28:32	12/4/2001	39.8	1.6	38.2	7645301.1	681491.0	45.515407	-122.672441	3019	8.7	1.3	7	2
83g	1	13:38:12	12/4/2001	13.8	1.3	12.5	7646353.3	680180.1	45.511891	-122.668201	3020	8.4	1.6	6	2
83g	2	13:38:53	12/4/2001	15.3	1.3	14.0	7646351.0	680183.1	45.511899	-122.668210	3026	8.4	1.6	6	2
83g	3	13:39:35	12/4/2001	17.8	1.3	16.5	7646345.9	680185.1	45.511904	-122.668230	3027	8.4	1.6	6	2
83f	1	13:44:00	12/4/2001	23.5	1.3	22.2	7646299.9	680163.7	45.511842	-122.668407	3031	8.4	1.6	6	2
83f	2	13:44:41	12/4/2001	23.3	1.3	22.0	7646293.6	680169.0	45.511856	-122.668432	3032	8.4	1.6	6	2
83f	3	13:45:33	12/4/2001	23.4	1.3	22.1	7646295.3	680169.8	45.511858	-122.668426	3037	8.4	1.6	6	2
83d	1	13:51:48	12/4/2001	31.4	1.3	30.1	7645366.4	679846.2	45.510902	-122.672014	3037	8.7	1.3	7	2
83d	2	13:52:24	12/4/2001	31.3	1.3	30.0	7645364.1	679849.2	45.510910	-122.672023	3043	8.7	1.3	7	2
83d	3	13:53:05	12/4/2001	31.1	1.3	29.8	7645361.6	679849.9	45.510912	-122.672033	3044	8.7	1.3	7	2
83c	1	13:59:46	12/4/2001	15.4	1.3	14.1	7645316.0	679383.8	45.509631	-122.672162	3049	8.7	1.3	7	2
83c	2	14:00:35	12/4/2001	14.6	1.3	13.3	7645316.0	679388.8	45.509645	-122.672162	3050	8.7	1.3	7	2
83c	3	14:01:11	12/4/2001	14.3	1.3	13.0	7645311.1	679391.9	45.509653	-122.672182	3055	8.7	1.3	7	2
83b	1	14:07:33	12/4/2001	14.7	1.3	13.4	7645191.9	679598.7	45.510211	-122.672668	3056	8.7	1.3	7	2
83b	2	14:08:13	12/4/2001	14.7	1.2	13.5	7645190.1	679601.2	45.510218	-122.672676	3061	8.7	1.3	7	2
83b	3	14:08:54	12/4/2001	14.6	1.2	13.4	7645189.4	679603.1	45.510223	-122.672679	3062	8.7	1.3	7	2
83a	1	14:16:57	12/4/2001	11.2	1.2	10.0	7645065.3	679881.1	45.510976	-122.673192	3067	8.5	1.5	6	2
83a	2	14:17:36	12/4/2001	11.2	1.2	10.0	7645065.3	679881.4	45.510977	-122.673192	3068	8.5	1.5	6	2
83a	3	14:18:35	12/4/2001	11.2	1.2	10.0	7645061.8	679880.8	45.510975	-122.673205	3073	8.5	1.5	6	2
84a	1	14:29:47	12/4/2001	11.7	1.2	10.5	7645534.8	678536.8	45.507325	-122.671220	3074	8.5	1.5	6	2
84a	2	14:30:24	12/4/2001	11.5	1.2	10.3	7645528.7	678553.3	45.507370	-122.671246	3079	8.5	1.5	6	2
84a	3	14:31:03	12/4/2001	11.6	1.2	10.4	7645537.6	678532.8	45.507314	-122.671209	3080	8.5	1.5	6	2
84b	1	14:37:41	12/4/2001	17.5	1.2	16.3	7645740.8	678646.4	45.507641	-122.670428	3085	7.1	2.9	5	2
84b	2	14:38:30	12/4/2001	17.5	1.2	16.3	7645736.5	678667.0	45.507697	-122.670447	3086	7.0	3.0	5	2
84b	3	14:39:21	12/4/2001	16.8	1.2	15.6	7645729.0	678661.7	45.507682	-122.670476	3090	7.5	2.5	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
84c	1	14:44:55	12/4/2001	45.4	1.1	44.3	7646304.2	678785.1	45.508063	-122.668246	3091	6.7	3.3	5	2
84c	2	14:45:38	12/4/2001	45.7	1.1	44.6	7646305.5	678789.8	45.508075	-122.668241	3096	6.7	3.3	5	2
84c	3	14:46:42	12/4/2001	46.5	1.1	45.4	7646321.0	678809.2	45.508130	-122.668183	3097	6.7	3.3	5	2
84d	1	14:52:32	12/4/2001	19.3	1.1	18.2	7646622.8	678884.5	45.508358	-122.667014	3101	8.2	1.8	5	2
84d	2	14:53:13	12/4/2001	20.3	1.1	19.2	7646618.5	678878.8	45.508342	-122.667030	3102	8.2	1.8	5	2
84d	3	14:54:52	12/4/2001	23.1	1.1	22.0	7646610.4	678882.6	45.508352	-122.667062	3110	8.6	1.4	6	2
85d	1	15:05:22	12/4/2001	19.7	1.1	18.6	7647184.8	677714.6	45.505192	-122.664700	3111	8.8	1.2	7	2
85d	2	15:06:44	12/4/2001	22.6	1.1	21.5	7647178.5	677703.4	45.505161	-122.664724	3119	8.9	1.1	7	2
85d	3	15:07:30	12/4/2001	21.7	1.1	20.6	7647178.5	677702.4	45.505158	-122.664724	3120	8.9	1.1	7	2
85c	1	15:13:13	12/4/2001	42.7	1.1	41.6	7647074.7	677678.9	45.505086	-122.665126	3125	9.1	0.9	8	2
85c	2	15:14:01	12/4/2001	42.1	1.1	41.0	7647080.7	677681.1	45.505093	-122.665103	3126	9.1	0.9	8	2
85c	3	15:14:45	12/4/2001	42.5	1.1	41.4	7647076.2	677680.8	45.505092	-122.665120	3131	9.1	0.9	8	2
85b	1	15:19:52	12/4/2001	44.5	1.1	43.4	7646591.1	677511.9	45.504593	-122.666994	3132	9.1	0.9	8	2
85b	2	15:20:32	12/4/2001	45.3	1.1	44.2	7646576.2	677526.5	45.504632	-122.667054	3137	9.1	0.9	8	2
85b	3	15:21:43	12/4/2001	44.7	1.1	43.6	7646572.7	677521.4	45.504618	-122.667067	3138	9.1	0.9	8	2
85a	1	15:26:24	12/4/2001	16.4	1.0	15.4	7646059.5	677329.2	45.504053	-122.669047	3142	8.9	1.1	7	2
85a	2	15:27:05	12/4/2001	16.6	1.0	15.6	7646059.0	677329.6	45.504054	-122.669050	3143	8.9	1.1	7	2
85a	3	15:27:49	12/4/2001	16.7	1.0	15.7	7646063.6	677322.2	45.504034	-122.669031	3147	8.9	1.1	7	2
86a	1	15:41:23	12/4/2001	26.0	1.0	25.0	7646478.2	676127.6	45.500789	-122.667289	3159	8.8	1.2	6	2
86a	2	15:42:00	12/4/2001	21.8	1.0	20.8	7646474.5	676120.6	45.500770	-122.667303	3160	8.8	1.2	6	2
86a	3	15:43:10	12/4/2001	21.1	1.0	20.1	7646472.5	676121.4	45.500772	-122.667311	3169	8.0	2.0	5	2
86b	1	15:47:02	12/4/2001	36.2	1.0	35.2	7646599.6	676102.4	45.500729	-122.666813	3170	8.6	1.4	6	2
86b	2	15:47:47	12/4/2001	36.7	1.0	35.7	7646592.0	676095.4	45.500709	-122.666842	3175	8.6	1.4	6	2
86b	3	15:48:53	12/4/2001	36.9	1.0	35.9	7646592.4	676086.1	45.500684	-122.666840	3176	8.6	1.4	6	2
86d	1	15:55:33	12/4/2001	8.6	1.0	7.6	7647861.1	676217.6	45.501137	-122.661907	3181	8.3	1.7	5	2
86d	2	15:56:12	12/4/2001	8.7	1.0	7.7	7647854.7	676208.0	45.501111	-122.661931	3182	8.3	1.7	5	2
86d	3	15:57:09	12/4/2001	8.2	1.0	7.2	7647845.2	676197.0	45.501080	-122.661967	3187	8.2	1.8	5	2
86c	1	16:01:03	12/4/2001	23.1	1.0	22.1	7647689.9	676200.6	45.501078	-122.662573	3188	8.6	1.4	7	2
86c	2	16:01:42	12/4/2001	23.1	1.0	22.1	7647689.7	676205.5	45.501092	-122.662574	3193	8.6	1.4	7	2
86c	3	16:02:26	12/4/2001	23.0	1.0	22.0	7647687.0	676216.4	45.501122	-122.662586	3194	8.6	1.4	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
87e	1	16:09:58	12/4/2001	5.4	1.0	4.4	7648151.8	674661.1	45.496891	-122.660611	3199	8.7	1.3	7	2
87e	2	16:10:35	12/4/2001	5.6	1.0	4.6	7648152.2	674655.7	45.496877	-122.660609	3200	8.7	1.3	7	2
87e	3	16:11:15	12/4/2001	5.6	1.0	4.6	7648152.3	674655.8	45.496877	-122.660609	3205	8.7	1.3	7	2
87d	1	16:16:40	12/4/2001	15.8	1.0	14.8	7647619.3	674777.7	45.497172	-122.662700	3206	8.6	1.4	6	2
87d	2	16:17:20	12/4/2001	15.8	1.0	14.8	7647622.3	674778.8	45.497175	-122.662688	3211	8.6	1.4	6	2
87d	3	16:18:03	12/4/2001	15.8	1.0	14.8	7647619.2	674777.2	45.497170	-122.662700	3212	8.6	1.4	6	2
87c	1	16:21:06	12/4/2001	6.8	1.0	5.8	7647516.9	674795.7	45.497214	-122.663101	3217	8.6	1.4	6	2
87c	2	16:21:43	12/4/2001	6.7	1.0	5.7	7647518.5	674787.8	45.497192	-122.663094	3218	8.7	1.3	6	2
87c	3	16:22:22	12/4/2001	5.5	1.0	4.5	7647517.5	674792.0	45.497204	-122.663098	3224	8.7	1.3	6	2
87b	1	16:32:42	12/4/2001	18.6	0.9	17.7	7646970.6	674929.1	45.497539	-122.665244	3225	8.1	1.9	5	2
87b	2	16:33:33	12/4/2001	20.6	0.9	19.7	7646967.5	674937.9	45.497563	-122.665257	3230	8.1	1.9	5	2
87b	3	16:35:43	12/4/2001	21.9	0.9	21.0	7646962.9	674938.1	45.497563	-122.665275	3236	8.2	1.8	5	2
87a	1	16:40:49	12/4/2001	15.9	0.9	15.0	7646413.8	675032.8	45.497783	-122.667426	3237	8.7	1.3	6	2
87a	2	16:41:34	12/4/2001	17.0	0.9	16.1	7646414.1	675025.0	45.497761	-122.667424	3242	8.7	1.3	6	2
87a	3	16:42:18	12/4/2001	18.4	0.9	17.5	7646415.9	675023.3	45.497757	-122.667417	3243	8.7	1.3	6	2
88a	1	16:48:28	12/4/2001	26.7	0.9	25.8	7646175.9	673749.9	45.494248	-122.668219	3248	8.7	1.3	6	2
88a	2	16:49:09	12/4/2001	26.7	0.9	25.8	7646173.5	673747.2	45.494240	-122.668228	3249	8.7	1.3	6	2
88a	3	16:49:53	12/4/2001	26.0	0.9	25.1	7646176.5	673754.7	45.494261	-122.668217	3254	8.7	1.3	6	2
88b	1	16:56:39	12/4/2001	52.3	0.9	51.4	7646639.2	673586.7	45.493835	-122.666396	3255	8.6	1.4	5	2
88b	2	16:57:19	12/4/2001	50.3	0.9	49.4	7646640.6	673601.1	45.493874	-122.666392	3260	8.6	1.4	5	2
88b	3	16:58:00	12/4/2001	52.6	0.9	51.7	7646633.4	673603.0	45.493879	-122.666420	3261	8.6	1.4	5	2
88c	1	17:05:11	12/4/2001	17.6	0.9	16.7	7646734.6	673579.0	45.493820	-122.666023	3266	8.6	1.4	5	2
88c	2	17:06:04	12/4/2001	19.2	0.9	18.3	7646723.5	673568.5	45.493791	-122.666066	3267	8.6	1.4	5	2
88c	3	17:06:58	12/4/2001	19.5	0.9	18.6	7646721.8	673564.4	45.493780	-122.666072	3272	8.6	1.4	5	2
16e	1	8:18:56	12/5/2001	40.1	1.2	38.9	7616782.7	720739.8	45.620853	-122.787988	3279	8.7	1.3	7	2
16e	2	8:19:42	12/5/2001	40.4	1.2	39.2	7616783.1	720736.6	45.620844	-122.787986	3280	8.7	1.3	7	2
16e	3	8:21:21	12/5/2001	40.2	1.2	39.0	7616781.7	720735.0	45.620839	-122.787991	3286	8.7	1.3	7	2
16d	1	8:27:07	12/5/2001	51.3	1.3	50.0	7616465.6	720671.0	45.620639	-122.789219	3287	8.8	1.2	7	2
16d	2	8:27:48	12/5/2001	51.2	1.3	49.9	7616464.5	720677.7	45.620658	-122.789224	3292	9.0	1.0	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
16d	3	8:28:32	12/5/2001	51.3	1.3	50.0	7616460.7	720673.4	45.620646	-122.789238	3293	9.0	1.0	8	2
16c	1	8:32:32	12/5/2001	52.4	1.4	51.0	7616037.9	720581.6	45.620361	-122.790880	3297	8.8	1.2	7	2
16c	2	8:33:14	12/5/2001	52.5	1.4	51.1	7616036.8	720588.2	45.620379	-122.790885	3298	8.8	1.2	7	2
16c	3	8:33:59	12/5/2001	52.4	1.4	51.0	7616041.3	720583.5	45.620367	-122.790867	3303	8.8	1.2	7	2
16b	1	8:37:35	12/5/2001	24.7	1.4	23.3	7615590.9	720498.0	45.620097	-122.792618	3304	8.8	1.2	7	2
16b	2	8:38:24	12/5/2001	24.6	1.4	23.2	7615589.4	720495.9	45.620091	-122.792623	3309	8.8	1.2	7	2
16b	3	8:40:01	12/5/2001	24.4	1.5	22.9	7615583.7	720490.3	45.620076	-122.792645	3315	8.8	1.2	7	2
16a	1	8:48:26	12/5/2001	12.3	1.6	10.7	7615071.3	720395.4	45.619775	-122.794636	3324	8.4	1.6	5	2
16a	2	8:50:06	12/5/2001	12.4	1.6	10.8	7615070.6	720398.4	45.619784	-122.794639	3329	8.4	1.6	5	2
16a	3	8:50:54	12/5/2001	12.6	1.6	11.0	7615068.9	720400.4	45.619789	-122.794646	3330	8.6	1.4	6	2
15a	1	8:54:45	12/5/2001	16.1	1.6	14.5	7615191.7	721328.5	45.622343	-122.794269	3335	8.8	1.2	7	2
15a	2	8:56:39	12/5/2001	16.7	1.6	15.1	7615201.5	721349.3	45.622401	-122.794233	3341	8.8	1.2	7	2
15a	3	8:58:21	12/5/2001	17.0	1.7	15.3	7615205.3	721353.5	45.622413	-122.794219	3347	8.8	1.2	7	2
15b	1	9:03:27	12/5/2001	23.9	1.7	22.2	7615421.4	721352.8	45.622427	-122.793374	3348	9.0	1.0	9	2
15b	2	9:04:59	12/5/2001	23.8	1.7	22.1	7615420.1	721346.4	45.622410	-122.793379	3356	9.0	1.0	9	2
15b	3	9:05:42	12/5/2001	24.1	1.7	22.4	7615420.0	721355.0	45.622433	-122.793380	3357	9.0	1.0	9	2
15c	1	9:09:45	12/5/2001	52.4	1.8	50.6	7615677.4	721374.7	45.622507	-122.792376	3362	9.0	1.0	9	2
15c	2	9:10:30	12/5/2001	52.5	1.8	50.7	7615675.8	721375.2	45.622509	-122.792383	3363	9.0	1.0	9	2
15c	3	9:11:22	12/5/2001	52.2	1.8	50.4	7615685.3	721371.0	45.622498	-122.792345	3368	8.8	1.2	8	2
15d	1	9:15:11	12/5/2001	54.2	1.8	52.4	7616004.7	721405.5	45.622617	-122.791101	3371	8.9	1.1	8	2
15d	2	9:17:31	12/5/2001	53.9	1.8	52.1	7616007.3	721410.3	45.622631	-122.791092	3378	8.9	1.1	8	2
15d	3	9:18:49	12/5/2001	53.9	1.8	52.1	7616011.6	721402.9	45.622611	-122.791074	3380	9.0	1.0	9	2
15e	1	9:24:56	12/5/2001	45.0	1.9	43.1	7616579.2	721456.4	45.622801	-122.788862	3385	9.0	1.0	8	2
15e	2	9:45:25	12/5/2001	44.8	2.0	42.8	7616579.1	721463.5	45.622821	-122.788863	3394	8.9	1.1	8	2
15e	3	9:46:06	12/5/2001	45.7	2.0	43.7	7616579.2	721460.6	45.622813	-122.788863	3395	8.9	1.1	8	2
15f	1	10:01:21	12/5/2001	19.8	2.0	17.8	7616817.3	721426.7	45.622738	-122.787929	3400	8.8	1.2	7	2
15f	2	10:02:10	12/5/2001	20.2	2.0	18.2	7616821.8	721433.3	45.622757	-122.787912	3401	8.8	1.2	7	2
15f	3	10:02:50	12/5/2001	20.6	2.0	18.6	7616830.1	721418.3	45.622716	-122.787878	3406	8.9	1.1	7	2
14f	1	10:14:09	12/5/2001	21.4	2.0	19.4	7616914.3	722279.2	45.625083	-122.787644	3407	9.1	0.9	9	2
14f	2	10:16:31	12/5/2001	22.9	2.0	20.9	7616909.8	722272.5	45.625064	-122.787661	3418	9.1	0.9	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
14f	3	10:17:20	12/5/2001	23.3	2.0	21.3	7616909.9	722282.7	45.625092	-122.787662	3419	9.1	0.9	9	2
14e	1	10:23:22	12/5/2001	50.6	2.0	48.6	7616694.5	722275.7	45.625056	-122.788503	3423	8.9	1.1	8	2
14e	2	10:24:13	12/5/2001	50.1	2.0	48.1	7616688.0	722274.8	45.625053	-122.788528	3424	8.9	1.1	8	2
14e	3	10:25:03	12/5/2001	50.1	2.0	48.1	7616688.3	722272.2	45.625046	-122.788526	3429	8.9	1.1	8	2
14d	1	10:29:04	12/5/2001	54.1	2.0	52.1	7616290.5	722304.3	45.625104	-122.790084	3430	9.1	0.9	9	2
14d	2	10:30:05	12/5/2001	54.0	2.0	52.0	7616290.7	722309.6	45.625118	-122.790084	3434	9.1	0.9	9	2
14d	3	10:30:53	12/5/2001	53.9	2.0	51.9	7616290.4	722300.7	45.625094	-122.790084	3435	9.1	0.9	9	2
14a	1	10:35:36	12/5/2001	10.0	2.0	8.0	7615216.0	722372.4	45.625207	-122.794290	3440	9.1	0.9	9	2
14a	2	10:36:18	12/5/2001	10.3	2.0	8.3	7615218.2	722367.5	45.625193	-122.794281	3441	9.1	0.9	9	2
14a	3	10:36:57	12/5/2001	10.4	2.0	8.4	7615221.2	722375.3	45.625215	-122.794270	3446	9.1	0.9	9	2
14b	1	10:42:24	12/5/2001	29.0	2.0	27.0	7615328.4	722379.3	45.625234	-122.793852	3447	9.1	0.9	9	2
14b	2	10:43:11	12/5/2001	29.3	2.0	27.3	7615332.2	722379.7	45.625236	-122.793837	3452	9.1	0.9	9	2
14b	3	10:44:00	12/5/2001	28.7	2.0	26.7	7615324.8	722367.8	45.625202	-122.793864	3454	9.1	0.9	9	2
14c	1	10:48:57	12/5/2001	59.7	2.0	57.7	7615950.0	722343.6	45.625185	-122.791419	3461	9.1	0.9	9	2
14c	2	10:49:41	12/5/2001	51.7	2.0	49.7	7615946.7	722341.3	45.625178	-122.791432	3462	9.1	0.9	9	2
14c	3	10:51:26	12/5/2001	60.1	2.0	58.1	7615944.7	722338.1	45.625169	-122.791439	3470	9.1	0.9	9	2
13a	1	10:59:22	12/5/2001	14.4	2.0	12.4	7615301.3	723384.7	45.627988	-122.794069	3475	9.1	0.9	9	2
13a	2	11:00:10	12/5/2001	15.1	2.0	13.1	7615303.8	723391.1	45.628006	-122.794060	3476	9.1	0.9	9	2
13a	3	11:00:55	12/5/2001	16.0	2.0	14.0	7615304.9	723389.3	45.628001	-122.794055	3481	9.1	0.9	9	2
13b	1	11:05:50	12/5/2001	29.5	2.0	27.5	7615386.7	723375.4	45.627969	-122.793734	3487	9.1	0.9	9	2
13b	2	11:06:34	12/5/2001	29.4	2.0	27.4	7615385.2	723373.9	45.627965	-122.793740	3488	9.1	0.9	9	2
13b	3	12:10:58	12/5/2001	29.8	1.8	28.0	7615393.4	723378.0	45.627977	-122.793708	3502	8.7	1.3	7	2
13c	1	12:15:34	12/5/2001	50.3	1.8	48.5	7615698.1	723356.2	45.627941	-122.792516	3503	8.9	1.1	8	2
13c	2	12:16:25	12/5/2001	50.2	1.8	48.4	7615703.8	723359.6	45.627951	-122.792494	3508	8.9	1.1	8	2
13c	3	12:17:20	12/5/2001	50.4	1.8	48.6	7615702.2	723367.7	45.627973	-122.792501	3509	8.7	1.3	7	2
13d	1	12:21:19	12/5/2001	55.6	1.8	53.8	7616097.7	723321.0	45.627876	-122.790950	3514	9.0	1.0	8	2
13d	2	12:22:03	12/5/2001	55.7	1.8	53.9	7616095.6	723319.6	45.627872	-122.790958	3515	9.0	1.0	8	2
13d	3	12:22:48	12/5/2001	55.5	1.8	53.7	7616099.5	723317.4	45.627866	-122.790943	3520	8.7	1.3	7	2
13e	1	12:26:40	12/5/2001	43.4	1.8	41.6	7616838.8	723250.8	45.627741	-122.788047	3521	8.7	1.3	7	2
13e	2	12:27:30	12/5/2001	43.9	1.8	42.1	7616826.1	723245.7	45.627726	-122.788096	3526	9.0	1.0	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
13e	3	12:28:10	12/5/2001	43.7	1.8	41.9	7616825.3	723238.6	45.627706	-122.788098	3527	9.0	1.0	8	2
13f	1	12:32:44	12/5/2001	13.7	1.8	11.9	7617091.3	723220.4	45.627677	-122.787057	3532	9.0	1.0	9	2
13f	2	12:33:25	12/5/2001	15.6	1.8	13.8	7617086.0	723211.4	45.627652	-122.787077	3533	9.0	1.0	9	2
13f	3	12:34:07	12/5/2001	15.9	1.8	14.1	7617084.7	723213.5	45.627658	-122.787082	3538	9.0	1.0	9	2
12f	1	12:42:04	12/5/2001	20.8	1.7	19.1	7617302.9	723855.7	45.629435	-122.786300	3539	9.1	0.9	9	2
12f	2	12:42:52	12/5/2001	20.4	1.7	18.7	7617303.6	723858.1	45.629442	-122.786298	3545	9.1	0.9	9	2
12f	3	12:43:35	12/5/2001	21.6	1.7	19.9	7617303.2	723859.6	45.629446	-122.786300	3546	9.0	1.0	8	2
12e	1	12:48:13	12/5/2001	46.0	1.7	44.3	7617074.2	723940.5	45.629650	-122.787203	3551	9.0	1.0	8	2
12e	2	12:48:56	12/5/2001	46.0	1.7	44.3	7617074.4	723946.1	45.629665	-122.787203	3552	9.0	1.0	8	2
12e	3	12:49:39	12/5/2001	45.9	1.7	44.2	7617078.3	723948.1	45.629671	-122.787188	3557	9.0	1.0	8	2
12d	1	12:53:22	12/5/2001	47.5	1.7	45.8	7616513.7	724157.8	45.630202	-122.789417	3558	9.0	1.0	8	2
12d	2	12:54:03	12/5/2001	47.5	1.7	45.8	7616514.1	724156.9	45.630200	-122.789416	3563	9.0	1.0	8	2
12d	3	12:54:46	12/5/2001	47.3	1.7	45.6	7616518.2	724159.6	45.630208	-122.789400	3564	9.0	1.0	8	2
12c	1	12:58:14	12/5/2001	53.3	1.7	51.6	7616309.4	724231.6	45.630389	-122.790224	3569	9.0	1.0	8	2
12c	2	12:58:58	12/5/2001	53.2	1.7	51.5	7616307.3	724232.8	45.630392	-122.790232	3570	8.7	1.3	8	2
12c	3	12:59:44	12/5/2001	53.2	1.7	51.5	7616310.4	724238.4	45.630407	-122.790221	3575	9.0	1.0	9	2
12b	1	13:03:51	12/5/2001	27.2	1.7	25.5	7615640.9	724476.2	45.631007	-122.792863	3576	8.9	1.1	8	2
12b	2	13:05:23	12/5/2001	27.2	1.7	25.5	7615641.7	724478.9	45.631015	-122.792860	3584	8.9	1.1	8	2
12b	3	13:07:07	12/5/2001	27.2	1.7	25.5	7615639.1	724475.8	45.631006	-122.792870	3590	8.9	1.1	8	2
12a	1	13:11:06	12/5/2001	15.6	1.6	14.0	7615502.5	724537.9	45.631166	-122.793411	3591	8.3	1.7	6	2
12a	2	13:13:39	12/5/2001	15.0	1.6	13.4	7615499.6	724535.9	45.631160	-122.793422	3602	8.7	1.3	7	2
12a	3	13:14:28	12/5/2001	14.6	1.6	13.0	7615496.7	724522.0	45.631122	-122.793432	3605	8.9	1.1	8	2
11a	1	13:21:54	12/5/2001	13.4	1.6	11.8	7615930.7	725700.5	45.634386	-122.791866	3606	9.0	1.0	9	2
11a	2	13:24:36	12/5/2001	13.2	1.6	11.6	7615933.1	725704.7	45.634398	-122.791858	3615	8.9	1.1	8	2
11a	3	13:26:09	12/5/2001	15.9	1.6	14.3	7615935.0	725698.6	45.634381	-122.791849	3620	8.9	1.1	8	2
11b	1	13:39:33	12/5/2001	27.0	1.5	25.5	7616085.6	725569.0	45.634038	-122.791247	3621	8.8	1.2	8	2
11b	2	13:40:32	12/5/2001	26.7	1.5	25.2	7616090.9	725576.9	45.634060	-122.791227	3622	8.7	1.3	7	2
11b	3	13:42:22	12/5/2001	26.7	1.5	25.2	7616088.4	725578.7	45.634065	-122.791237	3628	8.8	1.2	8	2
11c	1	14:11:22	12/5/2001	51.7	1.4	50.3	7616389.8	725360.0	45.633488	-122.790035	3633	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
11c	2	14:12:12	12/5/2001	51.7	1.4	50.3	7616397.2	725362.6	45.633496	-122.790006	3634	8.7	1.3	7	2
11c	3	14:13:00	12/5/2001	51.9	1.4	50.5	7616395.2	725364.1	45.633500	-122.790014	3639	8.7	1.3	7	2
11d	1	14:17:37	12/5/2001	54.1	1.4	52.7	7616699.0	725126.6	45.632873	-122.788801	3640	8.7	1.3	7	2
11d	2	14:18:20	12/5/2001	54.2	1.4	52.8	7616701.1	725131.2	45.632885	-122.788793	3645	8.7	1.3	7	2
11d	3	14:19:04	12/5/2001	54.2	1.4	52.8	7616705.4	725131.9	45.632887	-122.788776	3646	8.9	1.1	8	2
11e	1	14:27:23	12/5/2001	62.7	1.4	61.3	7617350.5	724625.3	45.631549	-122.786199	3651	8.7	1.3	7	2
11e	2	14:28:02	12/5/2001	62.7	1.4	61.3	7617346.1	724626.7	45.631552	-122.786217	3652	8.3	1.7	5	2
11e	3	14:28:43	12/5/2001	62.6	1.4	61.2	7617343.7	724624.0	45.631545	-122.786226	3656	8.7	1.3	7	2
11f	1	14:33:51	12/5/2001	13.7	1.4	12.3	7617542.1	724455.7	45.631099	-122.785432	3658	8.7	1.3	7	2
11f	2	14:35:34	12/5/2001	13.2	1.3	11.9	7617538.9	724453.7	45.631093	-122.785444	3665	8.7	1.3	7	2
11f	3	14:36:22	12/5/2001	14.0	1.3	12.7	7617537.4	724452.8	45.631090	-122.785450	3666	8.7	1.3	7	2
10f	1	14:41:24	12/5/2001	12.3	1.3	11.0	7618002.4	725356.1	45.633603	-122.783733	3670	8.8	1.2	7	2
10f	2	14:42:09	12/5/2001	12.3	1.3	11.0	7618004.4	725358.8	45.633610	-122.783725	3671	8.8	1.2	7	2
10f	3	14:42:53	12/5/2001	12.0	1.3	10.7	7618004.8	725357.0	45.633606	-122.783724	3676	8.8	1.2	7	2
10e	1	14:46:08	12/5/2001	30.9	1.3	29.6	7617922.4	725417.2	45.633764	-122.784052	3677	8.8	1.2	7	2
10e	2	14:46:57	12/5/2001	31.2	1.3	29.9	7617924.4	725416.8	45.633763	-122.784044	3681	8.8	1.2	7	2
10e	3	14:47:42	12/5/2001	30.9	1.3	29.6	7617925.3	725418.0	45.633766	-122.784041	3683	8.7	1.3	6	2
10d	1	14:53:18	12/5/2001	53.6	1.3	52.3	7617496.6	725741.1	45.634619	-122.785752	3685	8.9	1.1	7	2
10d	2	14:54:02	12/5/2001	53.7	1.3	52.4	7617498.6	725736.8	45.634608	-122.785743	3686	8.9	1.1	7	2
10d	3	14:54:50	12/5/2001	53.9	1.3	52.6	7617505.5	725740.9	45.634619	-122.785717	3691	8.9	1.1	7	2
10c	1	14:58:27	12/5/2001	51.0	1.3	49.7	7617045.2	726076.7	45.635504	-122.787553	3692	8.9	1.1	7	2
10c	2	14:59:13	12/5/2001	50.9	1.3	49.6	7617044.6	726081.8	45.635518	-122.787556	3697	8.9	1.1	7	2
10c	3	15:00:03	12/5/2001	51.1	1.3	49.8	7617049.6	726080.4	45.635514	-122.787536	3698	8.7	1.3	6	2
10b	1	15:04:39	12/5/2001	23.9	1.3	22.6	7616516.6	726451.6	45.636491	-122.789660	3706	9.1	0.9	8	2
10b	2	15:05:26	12/5/2001	24.0	1.3	22.7	7616518.8	726451.8	45.636491	-122.789652	3707	8.9	1.1	7	2
10b	3	15:06:10	12/5/2001	24.0	1.2	22.8	7616518.3	726456.2	45.636504	-122.789654	3712	8.9	1.1	7	2
10a	1	15:09:15	12/5/2001	10.4	1.2	9.2	7616435.4	726522.6	45.636679	-122.789985	3713	8.8	1.2	7	2
10a	2	15:10:00	12/5/2001	10.6	1.2	9.4	7616434.2	726519.4	45.636670	-122.789990	3718	8.8	1.2	7	2
10a	3	15:10:46	12/5/2001	10.9	1.2	9.7	7616437.4	726524.3	45.636684	-122.789978	3719	8.8	1.2	7	2
9a	1	15:18:42	12/5/2001	16.5	1.2	15.3	7617366.7	727319.6	45.638936	-122.786434	3724	8.8	1.2	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
9a	2	15:19:23	12/5/2001	17.3	1.2	16.1	7617362.3	727316.3	45.638927	-122.786451	3725	8.8	1.2	7	2
9a	3	15:20:07	12/5/2001	17.4	1.2	16.2	7617363.8	727317.7	45.638931	-122.786445	3729	8.8	1.2	7	2
9b	1	15:25:15	12/5/2001	26.2	1.2	25.0	7617436.0	727227.0	45.638688	-122.786153	3730	8.9	1.1	8	2
9b	2	15:27:30	12/5/2001	26.3	1.2	25.1	7617442.3	727221.3	45.638673	-122.786128	3738	8.9	1.1	8	2
9b	3	15:28:18	12/5/2001	26.1	1.2	24.9	7617440.7	727223.5	45.638679	-122.786134	3739	8.9	1.1	8	2
9c	1	15:31:40	12/5/2001	30.7	1.2	29.5	7617554.9	727077.2	45.638286	-122.785672	3743	8.9	1.1	8	2
9c	2	15:32:26	12/5/2001	30.8	1.2	29.6	7617556.4	727079.1	45.638292	-122.785666	3744	8.9	1.1	8	2
9c	3	15:33:11	12/5/2001	30.7	1.2	29.5	7617560.2	727082.3	45.638301	-122.785652	3749	8.9	1.1	8	2
9d	1	15:38:05	12/5/2001	54.8	1.2	53.6	7617831.4	726713.6	45.637311	-122.784551	3755	8.8	1.2	7	2
9d	2	15:39:57	12/5/2001	55.0	1.2	53.8	7617836.7	726716.0	45.637318	-122.784530	3761	8.8	1.2	7	2
9d	3	15:41:52	12/5/2001	54.0	1.2	52.8	7617822.5	726712.8	45.637308	-122.784586	3767	8.8	1.2	7	2
9e	1	15:48:25	12/5/2001	52.1	1.1	51.0	7618174.5	726275.3	45.636136	-122.783162	3768	8.6	1.4	6	2
9e	2	15:51:15	12/5/2001	52.2	1.1	51.1	7618179.8	726277.8	45.636143	-122.783141	3778	8.8	1.2	7	2
9e	3	15:52:00	12/5/2001	52.1	1.1	51.0	7618181.3	726279.0	45.636147	-122.783136	3779	8.8	1.2	7	2
9f	1	15:56:14	12/5/2001	14.4	1.1	13.3	7618432.3	725941.1	45.635240	-122.782117	3784	8.8	1.2	7	2
9f	2	15:57:04	12/5/2001	14.6	1.1	13.5	7618433.3	725944.3	45.635249	-122.782114	3785	8.8	1.2	7	2
9f	3	15:57:54	12/5/2001	14.7	1.1	13.6	7618432.5	725943.9	45.635247	-122.782117	3790	8.8	1.2	7	2
8f	1	16:21:48	12/5/2001	12.8	1.1	11.7	7619061.7	726671.2	45.637290	-122.779738	3791	7.8	2.2	6	2
8f	2	16:22:37	12/5/2001	14.0	1.1	12.9	7619062.0	726676.0	45.637303	-122.779738	3796	7.9	2.1	6	2
8f	3	16:23:27	12/5/2001	14.0	1.1	12.9	7619066.5	726679.8	45.637314	-122.779721	3797	7.9	2.1	6	2
8e	1	16:30:17	12/5/2001	24.5	1.0	23.5	7619026.9	726760.9	45.637533	-122.779884	3802	8.7	1.3	6	2
8e	2	16:31:09	12/5/2001	24.4	1.0	23.4	7619018.2	726756.3	45.637520	-122.779918	3803	8.7	1.3	6	2
8e	3	16:31:54	12/5/2001	24.5	1.0	23.5	7619020.3	726757.9	45.637525	-122.779909	3808	8.7	1.3	6	2
8d	1	16:36:16	12/5/2001	58.3	1.0	57.3	7618640.0	727306.5	45.638999	-122.781456	3809	8.7	1.3	6	2
8d	2	16:38:04	12/5/2001	58.2	1.0	57.2	7618638.4	727305.2	45.638995	-122.781462	3817	8.7	1.3	6	2
8d	3	16:38:45	12/5/2001	58.3	1.0	57.3	7618642.6	727309.1	45.639007	-122.781446	3818	8.7	1.3	6	2
8c	1	16:42:22	12/5/2001	48.5	1.0	47.5	7618480.4	727526.4	45.639590	-122.782104	3823	8.7	1.3	6	2
8c	2	16:44:09	12/5/2001	48.7	1.0	47.7	7618483.4	727532.1	45.639606	-122.782093	3829	8.7	1.3	6	2
8c	3	16:45:00	12/5/2001	48.7	1.0	47.7	7618483.2	727524.5	45.639585	-122.782093	3830	8.7	1.3	6	2
8b	1	16:50:43	12/5/2001	27.8	1.0	26.8	7618306.4	727774.0	45.640255	-122.782812	3841	8.7	1.3	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
8b	2	16:52:22	12/5/2001	28.2	1.0	27.2	7618308.4	727764.3	45.640229	-122.782803	3846	8.6	1.4	5	2
8b	3	16:53:59	12/5/2001	28.2	1.0	27.2	7618309.8	727761.7	45.640222	-122.782797	3852	8.7	1.3	6	2
8a	1	16:59:43	12/5/2001	14.6	1.0	13.6	7618231.6	727874.6	45.640525	-122.783115	3858	8.6	1.4	5	2
8a	2	17:01:28	12/5/2001	14.8	1.0	13.8	7618225.2	727868.8	45.640509	-122.783140	3862	8.6	1.4	5	2
8a	3	17:04:26	12/5/2001	16.2	1.0	15.2	7618236.0	727863.8	45.640496	-122.783097	3869	8.7	1.3	6	2
27d	1	9:13:53	12/6/2001	75.2	1.3	73.9	7618725.7	713932.1	45.602340	-122.779646	3877	8.7	1.3	7	2
27d	2	9:14:36	12/6/2001	75.0	1.3	73.7	7618730.5	713931.5	45.602339	-122.779627	3878	8.4	1.6	6	2
27d	3	9:18:24	12/6/2001	74.6	1.3	73.3	7618730.9	713935.8	45.602350	-122.779626	3883	8.7	1.3	7	2
7e	1	9:44:00	12/6/2001	10.6	1.6	9.0	7619853.5	727336.8	45.639176	-122.776717	3886	9.1	0.9	8	2
7e	2	9:44:49	12/6/2001	11.5	1.6	9.9	7619853.3	727338.7	45.639181	-122.776718	3887	8.9	1.1	7	2
7e	3	9:45:51	12/6/2001	11.7	1.6	10.1	7619854.4	727340.6	45.639187	-122.776714	3892	8.9	1.1	7	2
7d	1	9:54:38	12/6/2001	50.9	1.7	49.2	7619728.7	727502.2	45.639620	-122.777223	3893	9.1	0.9	9	2
7d	2	9:55:31	12/6/2001	51.2	1.7	49.5	7619727.5	727503.9	45.639624	-122.777228	3898	9.0	1.0	8	2
7d	3	9:56:20	12/6/2001	51.1	1.7	49.4	7619730.3	727508.5	45.639637	-122.777218	3899	9.0	1.0	8	2
7c	1	10:00:54	12/6/2001	61.4	1.8	59.6	7619443.8	727879.4	45.640632	-122.778378	3904	9.0	1.0	8	2
7c	2	10:01:52	12/6/2001	59.8	1.8	58.0	7619453.4	727887.2	45.640654	-122.778342	3905	9.0	1.0	8	2
7c	3	10:03:07	12/6/2001	61.1	1.8	59.3	7619458.5	727877.0	45.640627	-122.778321	3910	9.0	1.0	8	2
7b	1	10:12:34	12/6/2001	29.7	1.9	27.8	7619131.4	728304.1	45.641772	-122.779646	3911	8.8	1.2	7	2
7b	2	10:13:22	12/6/2001	30.3	1.9	28.4	7619130.8	728294.3	45.641745	-122.779647	3916	8.9	1.1	8	2
7b	3	10:14:14	12/6/2001	30.1	1.9	28.2	7619128.4	728297.0	45.641753	-122.779657	3917	8.8	1.2	7	2
7a	1	10:18:33	12/6/2001	15.1	1.9	13.2	7619077.0	728371.1	45.641952	-122.779866	3922	8.9	1.1	8	2
7a	2	10:19:24	12/6/2001	14.8	1.9	12.9	7619078.9	728374.5	45.641961	-122.779859	3923	8.9	1.1	8	2
7a	3	10:20:19	12/6/2001	14.4	1.9	12.5	7619070.0	728372.3	45.641954	-122.779893	3928	8.9	1.1	8	2
6a	1	10:30:47	12/6/2001	10.7	2.0	8.7	7619852.0	728910.7	45.643491	-122.776897	3936	8.9	1.1	8	2
6a	2	10:31:35	12/6/2001	10.5	2.0	8.5	7619855.8	728914.2	45.643501	-122.776882	3937	8.9	1.1	8	2
6a	3	10:32:19	12/6/2001	10.3	2.0	8.3	7619849.9	728911.8	45.643494	-122.776905	3941	8.9	1.1	8	2
6b	1	10:38:49	12/6/2001	36.3	2.0	34.3	7619915.6	728861.3	45.643360	-122.776642	3942	8.9	1.1	8	2
6b	2	10:39:33	12/6/2001	36.3	2.0	34.3	7619918.7	728865.7	45.643373	-122.776631	3947	8.6	1.4	7	2
6b	3	10:40:23	12/6/2001	35.7	2.0	33.7	7619914.1	728866.8	45.643375	-122.776649	3948	8.6	1.4	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
6c	1	10:45:23	12/6/2001	52.6	2.0	50.6	7620066.7	728663.7	45.642830	-122.776030	3953	8.9	1.1	8	2
6c	2	10:46:12	12/6/2001	54.1	2.0	52.1	7620072.8	728660.4	45.642822	-122.776006	3954	8.9	1.1	8	2
6c	3	10:47:05	12/6/2001	54.4	2.0	52.4	7620077.1	728664.7	45.642834	-122.775990	3959	8.9	1.1	8	2
6d	1	10:52:46	12/6/2001	62.3	2.0	60.3	7620216.3	728463.3	45.642293	-122.775423	3960	8.5	1.5	7	2
6d	2	10:54:26	12/6/2001	62.3	2.1	60.2	7620221.4	728460.4	45.642285	-122.775403	3965	8.5	1.5	7	2
6d	3	10:55:24	12/6/2001	62.7	2.1	60.6	7620220.7	728465.6	45.642299	-122.775406	3966	8.5	1.5	7	2
6e	1	11:00:33	12/6/2001	20.0	2.1	17.9	7620608.7	727957.9	45.640937	-122.773834	3971	8.9	1.1	8	2
6e	2	11:01:26	12/6/2001	17.6	2.1	15.5	7620604.1	727953.6	45.640925	-122.773852	3972	8.5	1.5	7	2
6e	3	11:02:16	12/6/2001	17.6	2.1	15.5	7620605.7	727954.4	45.640927	-122.773845	3977	8.5	1.5	7	2
5e	1	11:12:50	12/6/2001	28.8	2.1	26.7	7621464.5	728713.3	45.643074	-122.770572	3978	8.9	1.1	8	2
5e	2	11:13:45	12/6/2001	28.8	2.1	26.7	7621463.7	728709.7	45.643064	-122.770575	3983	8.9	1.1	8	2
5e	3	11:14:50	12/6/2001	29.5	2.1	27.4	7621475.9	728712.8	45.643074	-122.770528	3984	8.9	1.1	8	2
5e	4	11:18:23	12/6/2001	29.1	2.1	27.0	7621472.0	728695.5	45.643026	-122.770541	3987	8.9	1.1	8	2
5d	1	11:22:34	12/6/2001	56.1	2.1	54.0	7621340.4	728794.6	45.643287	-122.771066	3990	8.9	1.1	8	2
5d	2	11:23:28	12/6/2001	56.0	2.1	53.9	7621340.9	728795.2	45.643289	-122.771064	3995	8.9	1.1	8	2
5d	3	11:24:19	12/6/2001	56.6	2.1	54.5	7621336.1	728787.8	45.643268	-122.771082	3996	8.9	1.1	8	2
5c	1	11:29:58	12/6/2001	57.2	2.1	55.1	7620886.6	729158.5	45.644250	-122.772880	4001	9.0	1.0	8	2
5c	2	11:30:46	12/6/2001	58.4	2.1	56.3	7620889.8	729167.5	45.644275	-122.772869	4002	9.0	1.0	8	2
5c	3	11:31:39	12/6/2001	58.1	2.1	56.0	7620891.6	729170.6	45.644284	-122.772862	4005	8.6	1.4	7	2
5b	1	11:36:26	12/6/2001	24.7	2.0	22.7	7620468.9	729488.0	45.645121	-122.774549	4013	8.5	1.5	6	2
5b	2	11:37:23	12/6/2001	21.5	2.0	19.5	7620466.6	729495.2	45.645141	-122.774559	4014	8.5	1.5	6	2
5b	3	11:38:28	12/6/2001	19.9	2.0	17.9	7620464.1	729494.3	45.645138	-122.774568	4019	8.5	1.5	6	2
5a	1	11:41:57	12/6/2001	13.4	2.0	11.4	7620443.1	729489.5	45.645123	-122.774650	4020	8.5	1.5	6	2
5a	2	11:42:45	12/6/2001	12.8	2.0	10.8	7620442.1	729493.9	45.645135	-122.774654	4025	8.5	1.5	6	2
5a	3	11:43:43	12/6/2001	13.5	2.0	11.5	7620453.3	729498.9	45.645150	-122.774611	4026	8.5	1.5	6	2
4a	1	11:48:41	12/6/2001	11.5	2.0	9.5	7621037.3	730285.1	45.647350	-122.772415	4030	8.6	1.4	6	2
4a	2	11:49:32	12/6/2001	12.0	2.0	10.0	7621043.8	730281.9	45.647342	-122.772389	4031	8.6	1.4	6	2
4a	3	11:50:24	12/6/2001	12.5	2.0	10.5	7621043.7	730279.1	45.647334	-122.772389	4036	8.6	1.4	6	2
4b	1	12:21:41	12/6/2001	33.3	2.0	31.3	7621119.8	730219.2	45.647176	-122.772085	4037	9.0	1.0	8	2
4b	2	12:22:25	12/6/2001	32.8	2.0	30.8	7621120.7	730225.9	45.647194	-122.772082	4042	9.0	1.0	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
4b	3	12:23:12	12/6/2001	32.3	2.0	30.3	7621119.5	730230.1	45.647206	-122.772087	4043	9.0	1.0	9	2
4c	1	12:27:25	12/6/2001	49.7	2.0	47.7	7621338.7	730075.0	45.646797	-122.771214	4048	9.0	1.0	9	2
4c	2	12:28:18	12/6/2001	49.9	2.0	47.9	7621335.0	730074.6	45.646796	-122.771228	4049	9.0	1.0	9	2
4c	3	12:29:10	12/6/2001	52.7	2.0	50.7	7621340.4	730082.0	45.646817	-122.771208	4054	9.0	1.0	9	2
4d	1	12:33:20	12/6/2001	53.0	2.0	51.0	7621625.4	729856.7	45.646221	-122.770069	4055	9.1	0.9	9	2
4d	2	12:34:13	12/6/2001	53.6	2.0	51.6	7621626.2	729865.1	45.646244	-122.770067	4060	9.1	0.9	9	2
4d	3	12:35:08	12/6/2001	54.1	1.9	52.2	7621629.1	729872.5	45.646265	-122.770056	4061	9.1	0.9	9	2
4e	1	12:40:08	12/6/2001	27.9	1.9	26.0	7621938.3	729634.0	45.645635	-122.768822	4066	8.5	1.5	7	2
4e	2	12:40:58	12/6/2001	28.4	1.9	26.5	7621933.9	729636.7	45.645642	-122.768839	4067	8.7	1.3	8	2
4e	3	12:41:53	12/6/2001	28.8	1.9	26.9	7621930.7	729634.8	45.645636	-122.768852	4072	8.5	1.5	7	2
3f	1	12:47:34	12/6/2001	12.3	1.9	10.4	7622458.5	730510.1	45.648077	-122.766885	4073	8.5	1.5	7	2
3f	2	12:48:46	12/6/2001	14.5	1.9	12.6	7622455.8	730522.1	45.648109	-122.766896	4078	8.5	1.5	7	2
3f	3	12:50:20	12/6/2001	9.3	1.9	7.4	7622469.3	730513.5	45.648087	-122.766843	4084	8.7	1.3	8	2
3e	1	12:55:25	12/6/2001	27.3	1.9	25.4	7622427.2	730535.9	45.648145	-122.767010	4085	9.0	1.0	9	2
3e	2	12:56:15	12/6/2001	27.4	1.9	25.5	7622425.5	730534.4	45.648141	-122.767016	4089	8.5	1.5	7	2
3e	3	12:57:02	12/6/2001	28.1	1.9	26.2	7622421.2	730532.3	45.648135	-122.767032	4090	9.0	1.0	8	2
3d	1	13:02:03	12/6/2001	52.1	1.9	50.2	7622293.0	730608.9	45.648335	-122.767542	4094	8.8	1.2	7	2
3d	2	13:02:50	12/6/2001	52.0	1.9	50.1	7622288.6	730609.4	45.648336	-122.767560	4095	8.8	1.2	7	2
3d	3	13:03:49	12/6/2001	52.4	1.9	50.5	7622290.4	730619.0	45.648362	-122.767554	4100	8.8	1.2	7	2
3d	4	13:08:41	12/6/2001	52.8	1.9	50.9	7622298.0	730621.1	45.648368	-122.767524	4101	8.9	1.1	8	2
3c	1	13:12:09	12/6/2001	56.4	1.8	54.6	7622037.9	730755.4	45.648717	-122.768555	4106	8.7	1.3	7	2
3c	2	13:13:31	12/6/2001	56.0	1.8	54.2	7622032.9	730761.7	45.648733	-122.768576	4107	8.9	1.1	8	2
3c	3	13:14:29	12/6/2001	55.9	1.8	54.1	7622033.1	730761.5	45.648733	-122.768575	4112	8.9	1.1	8	2
3b	1	13:19:42	12/6/2001	43.6	1.8	41.8	7621678.6	730955.4	45.649237	-122.769982	4113	8.7	1.3	7	2
3b	2	13:20:39	12/6/2001	44.1	1.8	42.3	7621685.7	730961.2	45.649254	-122.769955	4118	8.7	1.3	7	2
3b	3	13:21:37	12/6/2001	44.2	1.8	42.4	7621688.8	730961.9	45.649256	-122.769943	4119	8.7	1.3	7	2
3a	1	13:24:47	12/6/2001	15.9	1.8	14.1	7621532.9	731030.9	45.649433	-122.770560	4124	8.7	1.3	7	2
3a	2	13:25:39	12/6/2001	16.0	1.8	14.2	7621533.4	731030.3	45.649432	-122.770558	4125	8.7	1.3	7	2
3a	3	13:26:31	12/6/2001	16.0	1.8	14.2	7621536.9	731036.0	45.649447	-122.770545	4130	8.7	1.3	7	2
2a	1	13:32:10	12/6/2001	16.8	1.8	15.0	7622007.6	731880.4	45.651799	-122.768797	4131	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
2a	2	13:33:12	12/6/2001	16.3	1.8	14.5	7622005.5	731880.6	45.651799	-122.768806	4136	8.7	1.3	7	2
2a	3	13:34:10	12/6/2001	15.7	1.8	13.9	7622002.5	731882.7	45.651804	-122.768817	4137	8.7	1.3	7	2
2b	1	13:37:16	12/6/2001	33.5	1.8	31.7	7622112.2	731814.7	45.651627	-122.768381	4142	8.7	1.3	7	2
2b	2	13:38:09	12/6/2001	33.6	1.8	31.8	7622110.2	731814.7	45.651626	-122.768389	4143	8.7	1.3	7	2
2b	3	13:39:07	12/6/2001	33.6	1.8	31.8	7622112.0	731816.8	45.651632	-122.768382	4148	8.7	1.3	7	2
2b	4	13:43:27	12/6/2001	33.1	1.8	31.3	7622107.6	731818.0	45.651635	-122.768399	4149	8.7	1.3	7	2
2b	5	13:44:20	12/6/2001	33.3	1.7	31.6	7622114.8	731830.1	45.651669	-122.768373	4154	8.7	1.3	7	2
2c	1	13:49:19	12/6/2001	53.8	1.7	52.1	7622314.4	731689.4	45.651299	-122.767577	4155	8.7	1.3	7	2
2c	2	13:50:16	12/6/2001	53.9	1.7	52.2	7622317.5	731697.2	45.651320	-122.767566	4160	8.7	1.3	7	2
2c	3	13:51:09	12/6/2001	54.1	1.7	52.4	7622325.5	731691.8	45.651306	-122.767534	4161	8.7	1.3	7	2
2d	1	13:54:51	12/6/2001	58.6	1.7	56.9	7622625.5	731520.3	45.650859	-122.766342	4168	8.7	1.3	7	2
2d	2	13:55:53	12/6/2001	58.8	1.7	57.1	7622627.8	731529.3	45.650884	-122.766334	4169	8.7	1.3	7	2
2d	3	13:56:51	12/6/2001	58.9	1.7	57.2	7622626.8	731529.8	45.650885	-122.766338	4174	8.7	1.3	7	2
2e	1	14:03:38	12/6/2001	29.1	1.7	27.4	7622893.6	731374.3	45.650479	-122.765278	4175	8.5	1.5	6	2
2e	2	14:04:34	12/6/2001	30.4	1.7	28.7	7622886.9	731375.8	45.650483	-122.765305	4180	8.4	1.6	6	2
2e	3	14:05:23	12/6/2001	30.4	1.7	28.7	7622889.7	731377.6	45.650488	-122.765294	4181	8.5	1.5	6	2
2f	1	14:08:33	12/6/2001	13.2	1.7	11.5	7622917.2	731343.7	45.650397	-122.765183	4186	8.4	1.6	5	2
2f	2	14:09:24	12/6/2001	14.4	1.7	12.7	7622925.0	731354.1	45.650426	-122.765153	4187	8.5	1.5	6	2
2f	3	14:10:13	12/6/2001	13.4	1.7	11.7	7622924.1	731351.6	45.650419	-122.765157	4192	8.7	1.3	7	2
1f	1	14:17:35	12/6/2001	17.0	1.6	15.4	7623428.1	731919.0	45.652014	-122.763249	4193	8.9	1.1	8	2
1f	2	14:18:25	12/6/2001	15.0	1.6	13.4	7623423.6	731911.5	45.651993	-122.763266	4197	8.9	1.1	8	2
1f	3	14:19:19	12/6/2001	13.9	1.6	12.3	7623425.0	731920.6	45.652018	-122.763261	4198	8.7	1.3	7	2
1e	1	14:23:24	12/6/2001	17.3	1.6	15.7	7623368.0	731983.3	45.652185	-122.763491	4203	8.7	1.3	7	2
1e	2	14:24:11	12/6/2001	15.6	1.6	14.0	7623362.8	731983.1	45.652184	-122.763511	4204	8.7	1.3	7	2
1e	3	14:25:15	12/6/2001	15.1	1.6	13.5	7623360.0	731982.2	45.652182	-122.763522	4209	8.6	1.4	6	2
1d	1	14:30:21	12/6/2001	51.5	1.6	49.9	7623151.0	732252.5	45.652907	-122.764369	4210	8.7	1.3	7	2
1d	2	14:31:29	12/6/2001	51.5	1.6	49.9	7623154.2	732258.4	45.652923	-122.764357	4215	8.7	1.3	7	2
1d	3	14:32:26	12/6/2001	51.3	1.6	49.7	7623154.8	732258.3	45.652923	-122.764354	4216	8.5	1.5	6	2
1c	1	14:36:47	12/6/2001	53.3	1.6	51.7	7622804.5	732661.4	45.654001	-122.765768	4221	8.8	1.2	7	2
1c	2	14:37:36	12/6/2001	53.2	1.6	51.6	7622789.7	732658.8	45.653993	-122.765826	4222	8.6	1.4	6	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
1c	3	14:38:31	12/6/2001	53.1	1.6	51.5	7622798.4	732673.2	45.654033	-122.765793	4226	8.8	1.2	7	2
1b	1	14:42:52	12/6/2001	46.3	1.5	44.8	7622543.3	732951.6	45.654776	-122.766821	4227	8.6	1.4	6	2
1b	2	14:43:43	12/6/2001	45.4	1.5	43.9	7622540.6	732956.3	45.654789	-122.766832	4232	8.2	1.8	5	2
1b	3	14:44:30	12/6/2001	45.6	1.5	44.1	7622540.3	732953.3	45.654781	-122.766833	4233	8.6	1.4	6	2
1a	1	14:48:23	12/6/2001	34.4	1.5	32.9	7622531.1	732998.8	45.654905	-122.766874	4238	8.6	1.4	6	2
1a	2	14:49:24	12/6/2001	35.7	1.5	34.2	7622521.7	732989.6	45.654879	-122.766910	4239	8.1	1.9	5	2
1a	3	14:50:24	12/6/2001	34.4	1.5	32.9	7622519.0	732996.0	45.654896	-122.766921	4243	8.1	1.9	5	2
64e	1	16:12:20	12/6/2001	21.0	1.2	19.8	7636770.4	699102.4	45.563057	-122.707585	4244	8.2	1.8	5	2
64e	2	16:13:41	12/6/2001	21.2	1.2	20.0	7636767.9	699099.9	45.563050	-122.707595	4249	8.7	1.3	7	2
64e	3	16:14:32	12/6/2001	21.0	1.2	19.8	7636758.1	699109.0	45.563075	-122.707634	4250	7.7	2.3	6	2
63e	1	16:19:08	12/6/2001	28.0	1.2	26.8	7636168.2	699077.9	45.562945	-122.709933	4255	7.9	2.1	5	2
63e	2	16:20:00	12/6/2001	28.3	1.2	27.1	7636164.3	699075.7	45.562939	-122.709948	4256	8.7	1.3	6	2
63e	3	16:20:54	12/6/2001	28.0	1.2	26.8	7636162.4	699077.1	45.562943	-122.709956	4261	8.7	1.3	6	2
62e	1	16:26:09	12/6/2001	30.1	1.2	28.9	7635982.5	699592.0	45.564341	-122.710713	4262	8.1	1.9	5	2
62e	2	16:26:59	12/6/2001	29.8	1.2	28.6	7635981.6	699590.3	45.564336	-122.710717	4267	8.1	1.9	5	2
62e	3	16:27:53	12/6/2001	29.9	1.2	28.7	7635980.2	699591.1	45.564338	-122.710722	4268	8.1	1.9	5	2
61e	1	16:32:58	12/6/2001	42.4	1.2	41.2	7635314.5	699743.9	45.564707	-122.713337	4273	8.7	1.3	6	2
61e	2	16:33:51	12/6/2001	42.5	1.2	41.3	7635314.1	699742.0	45.564702	-122.713338	4274	8.7	1.3	6	2
61e	3	16:34:48	12/6/2001	42.5	1.2	41.3	7635313.9	699741.5	45.564700	-122.713339	4279	8.7	1.3	6	2
60e	1	16:39:57	12/6/2001	36.5	1.2	35.3	7634977.9	700413.7	45.566518	-122.714722	4280	8.7	1.3	6	2
60e	2	16:40:52	12/6/2001	37.2	1.2	36.0	7634976.8	700408.9	45.566505	-122.714726	4285	8.7	1.3	6	2
60e	3	16:41:47	12/6/2001	36.0	1.2	34.8	7634979.9	700405.2	45.566495	-122.714714	4286	8.7	1.3	6	2
59f	1	16:47:17	12/6/2001	40.1	1.1	39.0	7634253.1	700638.0	45.567078	-122.717575	4291	8.6	1.4	5	2
59f	2	16:48:10	12/6/2001	40.3	1.1	39.2	7634250.4	700638.1	45.567079	-122.717586	4292	8.6	1.4	5	2
59f	3	16:49:07	12/6/2001	40.2	1.1	39.1	7634252.4	700641.7	45.567088	-122.717578	4296	8.6	1.4	5	2
58f	1	16:54:10	12/6/2001	30.3	1.1	29.2	7633971.1	701272.9	45.568798	-122.718744	4297	8.6	1.4	5	2
58f	2	16:55:05	12/6/2001	30.0	1.1	28.9	7633973.8	701273.8	45.568801	-122.718733	4302	8.6	1.4	6	2
58f	3	16:56:02	12/6/2001	29.8	1.1	28.7	7633974.5	701271.2	45.568793	-122.718730	4303	8.6	1.4	6	2
58e	1	17:00:04	12/6/2001	39.8	1.1	38.7	7633696.1	700979.8	45.567973	-122.719786	4308	8.6	1.4	5	2
58e	2	17:01:11	12/6/2001	39.9	1.1	38.8	7633697.2	700983.4	45.567984	-122.719782	4309	8.6	1.4	5	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
58e	3	17:03:06	12/6/2001	39.5	1.1	38.4	7633693.3	700987.7	45.567995	-122.719798	4317	8.6	1.4	5	2
57g	1	17:09:27	12/6/2001	35.1	1.1	34.0	7633504.3	701770.5	45.570127	-122.720619	4318	8.5	1.5	5	2
57g	2	17:10:18	12/6/2001	35.0	1.1	33.9	7633503.6	701768.0	45.570120	-122.720622	4323	8.5	1.5	5	2
57g	3	17:11:10	12/6/2001	35.6	1.1	34.5	7633503.1	701768.4	45.570121	-122.720624	4324	8.6	1.4	6	2
57f	1	17:15:48	12/6/2001	38.7	1.1	37.6	7633044.4	701276.3	45.568737	-122.722362	4329	8.6	1.4	6	2
57f	2	17:16:57	12/6/2001	39.7	1.1	38.6	7633043.9	701279.5	45.568746	-122.722364	4330	8.4	1.6	5	2
57f	3	17:18:09	12/6/2001	39.2	1.1	38.1	7633044.6	701274.3	45.568732	-122.722360	4335	8.5	1.5	6	2
57f	4	17:22:20	12/6/2001	39.1	1.1	38.0	7633059.6	701270.3	45.568722	-122.722302	4336	8.4	1.6	5	2
57e	1	17:30:30	12/6/2001	49.1	1.0	48.1	7632782.2	700995.7	45.567948	-122.723355	4341	8.3	1.7	5	2
57e	2	17:31:24	12/6/2001	50.0	1.0	49.0	7632779.7	700996.9	45.567951	-122.723365	4342	8.3	1.7	5	2
57e	3	17:32:20	12/6/2001	49.6	1.0	48.6	7632780.7	700997.1	45.567952	-122.723361	4348	8.3	1.7	5	2
57d	1	17:40:09	12/6/2001	51.2	1.0	50.2	7632247.9	700420.5	45.566331	-122.725379	4349	8.2	1.8	5	2
57d	2	17:41:06	12/6/2001	55.5	1.0	54.5	7632237.4	700418.5	45.566325	-122.725420	4352	8.6	1.4	6	2
57d	3	17:42:05	12/6/2001	57.4	1.0	56.4	7632238.2	700418.9	45.566326	-122.725416	4353	8.2	1.8	5	2
89a	1	9:03:14	12/7/2001	15.2	0.5	14.7	7645686.2	672515.4	45.490827	-122.669999	4365	8.7	1.3	7	2
89a	2	9:06:39	12/7/2001	16.4	0.6	15.8	7645702.7	672506.2	45.490803	-122.669934	4366	8.7	1.3	7	2
89a	3	9:07:34	12/7/2001	15.9	0.6	15.3	7645697.5	672522.0	45.490846	-122.669956	4371	8.7	1.3	7	2
89b	1	9:12:39	12/7/2001	31.8	0.6	31.2	7645953.5	672477.3	45.490743	-122.668953	4372	8.7	1.3	7	2
89b	2	9:13:27	12/7/2001	31.6	0.7	30.9	7645953.4	672490.5	45.490779	-122.668955	4377	8.7	1.3	7	2
89b	3	9:14:30	12/7/2001	31.4	0.7	30.7	7645948.0	672497.7	45.490798	-122.668977	4378	8.8	1.2	7	2
89c	1	9:20:44	12/7/2001	16.3	0.7	15.6	7646365.6	672405.4	45.490576	-122.667339	4383	9.1	0.9	9	2
89c	2	9:21:48	12/7/2001	15.9	0.8	15.1	7646370.8	672405.5	45.490576	-122.667319	4384	5.3	4.7	5	2
89c	3	9:22:43	12/7/2001	17.0	0.8	16.2	7646370.4	672411.2	45.490592	-122.667321	4389	8.9	1.1	8	2
90c	1	9:30:15	12/7/2001	5.8	0.9	4.9	7646161.9	671153.9	45.487129	-122.668002	4390	5.5	4.5	6	2
90c	2	9:34:17	12/7/2001	17.1	0.9	16.2	7646149.2	671154.4	45.487130	-122.668052	4401	5.8	4.2	6	2
90c	3	9:35:16	12/7/2001	17.2	0.9	16.3	7646143.5	671149.1	45.487115	-122.668073	4402	8.8	1.2	7	2
90b	1	9:40:31	12/7/2001	54.6	1.0	53.6	7645855.2	671161.7	45.487128	-122.669198	4407	9.0	1.0	9	2
90b	2	9:41:36	12/7/2001	58.9	1.0	57.9	7645864.5	671169.3	45.487150	-122.669163	4408	9.0	1.0	9	2
90b	3	9:42:25	12/7/2001	57.1	1.0	56.1	7645856.9	671176.8	45.487170	-122.669193	4413	8.3	1.7	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
90a	1	9:48:13	12/7/2001	7.0	1.1	5.9	7645133.5	671171.9	45.487103	-122.672013	4414	8.9	1.1	8	2
90a	2	9:49:11	12/7/2001	6.9	1.1	5.8	7645132.8	671172.0	45.487103	-122.672015	4419	8.9	1.1	8	2
90a	3	9:50:06	12/7/2001	6.9	1.1	5.8	7645136.3	671169.1	45.487096	-122.672001	4420	8.9	1.1	8	2
91a	1	9:56:02	12/7/2001	12.1	1.2	10.9	7645175.6	669784.5	45.483302	-122.671703	4425	8.9	1.1	8	2
91a	2	9:56:54	12/7/2001	12.6	1.2	11.4	7645179.5	669784.5	45.483302	-122.671688	4426	8.9	1.1	8	2
91a	3	9:57:47	12/7/2001	12.4	1.2	11.2	7645177.5	669786.5	45.483308	-122.671696	4431	8.9	1.1	8	2
91b	1	10:05:00	12/7/2001	43.8	1.3	42.5	7645427.6	669824.7	45.483431	-122.670725	4432	8.5	1.5	7	2
91b	2	10:05:52	12/7/2001	43.8	1.3	42.5	7645428.0	669827.9	45.483440	-122.670724	4437	8.9	1.1	8	2
91b	3	10:06:40	12/7/2001	43.3	1.3	42.0	7645425.4	669832.1	45.483451	-122.670735	4438	8.6	1.4	7	2
91c	1	10:11:11	12/7/2001	8.5	1.4	7.1	7646378.5	669895.7	45.483696	-122.667026	4443	8.6	1.4	7	2
91c	2	10:12:09	12/7/2001	8.4	1.4	7.0	7646374.5	669902.6	45.483714	-122.667043	4444	8.6	1.4	7	2
91c	3	10:13:02	12/7/2001	8.7	1.4	7.3	7646369.1	669902.4	45.483713	-122.667063	4449	8.6	1.4	7	2
92c	1	10:22:39	12/7/2001	20.0	1.5	18.5	7646782.1	669162.1	45.481714	-122.665376	4450	9.1	0.9	9	2
92c	2	10:30:41	12/7/2001	20.5	1.6	18.9	7646793.4	669174.0	45.481748	-122.665334	4455	9.1	0.9	9	2
92c	3	10:32:12	12/7/2001	20.0	1.6	18.4	7646786.8	669163.9	45.481719	-122.665358	4456	9.1	0.9	9	2
92c	4	10:33:13	12/7/2001	19.8	1.6	18.2	7646789.7	669157.3	45.481702	-122.665346	4461	9.1	0.9	9	2
92d	1	10:38:19	12/7/2001	39.5	1.7	37.8	7647087.6	668734.4	45.480564	-122.664141	4462	9.1	0.9	9	2
92d	2	10:39:18	12/7/2001	39.8	1.7	38.1	7647089.3	668728.9	45.480549	-122.664134	4467	9.1	0.9	9	2
92d	3	10:40:09	12/7/2001	39.7	1.7	38.0	7647088.8	668729.7	45.480551	-122.664136	4468	9.1	0.9	9	2
92b	1	10:48:59	12/7/2001	19.6	1.7	17.9	7646302.3	668596.5	45.480128	-122.667187	4473	8.8	1.2	8	2
92b	2	10:49:58	12/7/2001	19.3	1.8	17.5	7646297.6	668613.3	45.480174	-122.667207	4474	8.8	1.2	8	2
92b	3	10:50:56	12/7/2001	19.1	1.8	17.3	7646298.6	668614.8	45.480178	-122.667204	4479	8.8	1.2	8	2
92a	1	11:02:12	12/7/2001	21.2	1.9	19.3	7645548.4	668496.0	45.479797	-122.670115	4489	9	1	9	2
92a	2	11:04:40	12/7/2001	21.0	1.9	19.1	7645545.3	668492.4	45.479787	-122.670127	4494	8.8	1.2	8	2
92a	3	11:05:31	12/7/2001	21.0	1.9	19.1	7645548.1	668486.8	45.479772	-122.670115	4495	8.8	1.2	8	2
93a	1	11:17:35	12/7/2001	3.5	2.0	1.5	7645912.6	667254.2	45.476419	-122.668566	4503	8.9	1.1	8	2
93a	2	11:18:35	12/7/2001	3.9	2.0	1.9	7645913.2	667247.9	45.476402	-122.668563	4504	8.9	1.1	8	2
93a	3	11:19:36	12/7/2001	3.5	2.0	1.5	7645901.8	667253.3	45.476416	-122.668608	4509	8.9	1.1	8	2
93b	1	11:26:18	12/7/2001	8.5	2.0	6.5	7646024.6	667271.4	45.476475	-122.668131	4515	9.0	1.0	9	2
93b	2	11:27:19	12/7/2001	7.4	2.0	5.4	7646015.0	667269.8	45.476470	-122.668168	4516	9.0	1.0	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
93b	3	11:28:15	12/7/2001	7.7	2.0	5.7	7646011.3	667271.1	45.476473	-122.668183	4521	8.9	1.1	8	2
93c	1	11:35:11	12/7/2001	34.5	2.1	32.4	7646929.6	667372.1	45.476817	-122.664615	4522	8.7	1.3	7	2
93c	2	11:36:04	12/7/2001	34.5	2.1	32.4	7646927.7	667372.7	45.476819	-122.664622	4527	8.7	1.3	7	2
93c	3	11:36:59	12/7/2001	36.2	2.1	34.1	7646929.0	667365.7	45.476800	-122.664616	4528	8.7	1.3	7	2
93d	1	11:50:21	12/7/2001	4.6	2.1	2.5	7647568.5	667611.4	45.477520	-122.662150	4533	8.7	1.3	7	2
93d	2	11:51:16	12/7/2001	4.4	2.1	2.3	7647564.6	667600.2	45.477489	-122.662164	4534	8.7	1.3	7	2
93d	3	11:52:10	12/7/2001	4.6	2.1	2.5	7647577.1	667601.9	45.477495	-122.662115	4539	8.7	1.3	7	2
93e	1	11:57:41	12/7/2001	5.6	2.1	3.5	7647664.4	667451.3	45.477088	-122.661759	4541	8.7	1.3	7	2
93e	2	11:58:37	12/7/2001	5.7	2.1	3.6	7647670.8	667455.4	45.477100	-122.661735	4544	8.7	1.3	7	2
93e	3	11:59:31	12/7/2001	5.8	2.1	3.7	7647666.9	667454.1	45.477096	-122.661750	4545	8.7	1.3	7	2
93f	1	12:39:03	12/7/2001	4.6	2.1	2.5	7648079.7	667603.9	45.477537	-122.660157	4550	8.6	1.4	8	2
93f	2	12:39:58	12/7/2001	4.6	2.1	2.5	7648076.2	667598.0	45.477521	-122.660170	4551	8.6	1.4	8	2
93f	3	12:40:55	12/7/2001	4.7	2.1	2.6	7648086.0	667600.5	45.477528	-122.660132	4555	8.8	1.2	9	2
93g	1	12:45:13	12/7/2001	7.6	2.1	5.5	7648318.6	667522.1	45.477330	-122.659217	4556	8.5	1.5	7	2
93g	2	12:46:05	12/7/2001	7.6	2.1	5.5	7648318.1	667522.6	45.477332	-122.659219	4561	8.5	1.5	7	2
93g	3	12:46:57	12/7/2001	7.9	2.1	5.8	7648324.5	667522.0	45.477330	-122.659194	4562	8.5	1.5	7	2
93h	1	12:53:51	12/7/2001	16.6	2.1	14.5	7648673.8	667567.3	45.477480	-122.657837	4567	8.8	1.2	7	2
93h	2	12:54:54	12/7/2001	16.5	2.1	14.4	7648674.5	667568.7	45.477484	-122.657835	4568	8.9	1.1	7	2
93h	3	12:55:54	12/7/2001	16.7	2.1	14.6	7648666.6	667566.8	45.477479	-122.657866	4573	8.3	1.7	6	2
93i	1	13:00:33	12/7/2001	10.8	2.1	8.7	7648743.4	667553.3	45.477447	-122.657565	4574	8.4	1.6	6	2
93i	2	13:01:25	12/7/2001	11.7	2.1	9.6	7648740.5	667552.8	45.477445	-122.657576	4579	8.4	1.6	6	2
93i	3	13:02:14	12/7/2001	12.5	2.1	10.4	7648733.7	667547.2	45.477430	-122.657602	4580	8.4	1.6	6	2
92h	1	13:10:11	12/7/2001	16.1	2.1	14.0	7649389.2	669086.7	45.481698	-122.655208	4585	8.4	1.6	6	2
92h	2	13:11:02	12/7/2001	15.7	2.0	13.7	7649392.3	669099.1	45.481733	-122.655197	4586	8.4	1.6	6	2
92h	3	13:11:59	12/7/2001	15.7	2.0	13.7	7649387.8	669095.7	45.481723	-122.655214	4591	8.4	1.6	6	2
92g	1	13:15:34	12/7/2001	14.3	2.0	12.3	7649128.2	669040.5	45.481553	-122.656220	4592	8.7	1.3	7	2
92g	2	13:16:49	12/7/2001	14.2	2.0	12.2	7649134.6	669055.1	45.481593	-122.656197	4597	8.7	1.3	7	2
92g	3	13:17:50	12/7/2001	13.9	2.0	11.9	7649126.1	669049.3	45.481577	-122.656229	4598	8.7	1.3	7	2
92f	1	13:22:53	12/7/2001	8.5	2.0	6.5	7648700.0	668970.0	45.481328	-122.657881	4603	8.7	1.3	7	2
92f	2	13:23:46	12/7/2001	7.0	2.0	5.0	7648693.5	668959.6	45.481299	-122.657906	4604	8.7	1.3	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
92f	3	13:24:41	12/7/2001	7.2	2.0	5.2	7648703.6	668955.1	45.481288	-122.657866	4608	8.7	1.3	7	2
91g	1	13:33:21	12/7/2001	10.6	2.0	8.6	7649529.6	670220.4	45.484817	-122.654778	4609	8.7	1.3	7	2
91g	2	13:34:07	12/7/2001	10.8	2.0	8.8	7649532.4	670224.7	45.484829	-122.654768	4614	8.7	1.3	7	2
91g	3	13:34:57	12/7/2001	10.6	2.0	8.6	7649532.4	670224.9	45.484830	-122.654768	4615	8.7	1.3	7	2
90h	1	13:40:29	12/7/2001	19.1	2.0	17.1	7649943.3	671085.9	45.487220	-122.653256	4620	8.6	1.4	6	2
90h	2	13:41:55	12/7/2001	23.3	2.0	21.3	7649929.2	671081.4	45.487207	-122.653310	4621	8.4	1.6	6	2
90h	3	13:43:01	12/7/2001	24.7	2.0	22.7	7649924.8	671087.0	45.487222	-122.653328	4626	8.4	1.6	6	2
89h	1	13:48:38	12/7/2001	20.9	2.0	18.9	7649167.8	671941.5	45.489509	-122.656367	4627	8.7	1.3	7	2
89h	2	13:50:20	12/7/2001	17.0	2.0	15.0	7649156.5	671933.8	45.489488	-122.656411	4632	8.7	1.3	7	2
89h	3	13:51:10	12/7/2001	15.4	2.0	13.4	7649153.0	671928.8	45.489474	-122.656424	4633	8.7	1.3	7	2
89h	4	13:59:08	12/7/2001	17.7	1.9	15.8	7649166.4	671930.5	45.489479	-122.656372	4638	8.7	1.3	7	2
88e	1	14:03:45	12/7/2001	14.6	1.9	12.7	7648504.0	672992.9	45.492343	-122.659065	4639	8.7	1.3	7	2
88e	2	14:08:07	12/7/2001	14.0	1.9	12.1	7648502.4	672988.4	45.492331	-122.659070	4645	8.4	1.6	6	2
88e	3	14:10:30	12/7/2001	16.6	1.9	14.7	7648499.9	673002.9	45.492371	-122.659082	4646	8.5	1.5	6	2
85a	1	14:45:48	12/7/2001	15.8	1.8	14.0	7646093.1	677324.3	45.504042	-122.668916	4658	8.6	1.4	6	2
85a	2	14:49:55	12/7/2001	16.7	1.8	14.9	7646075.9	677319.7	45.504028	-122.668983	4659	8.8	1.2	7	2
85a	3	14:51:02	12/7/2001	16.7	1.8	14.9	7646078.7	677317.2	45.504021	-122.668971	4667	8.8	1.2	7	2
74b	1	15:16:53	12/7/2001	58.4	1.7	56.7	7642318.5	690099.4	45.538788	-122.684981	4670	9.1	0.9	8	2
74b	2	15:17:54	12/7/2001	58.2	1.7	56.5	7642317.2	690104.8	45.538803	-122.684986	4673	9.1	0.9	8	2
74b	3	15:18:58	12/7/2001	58.5	1.7	56.8	7642312.9	690106.9	45.538808	-122.685003	4674	9.1	0.9	8	2
74a	1	15:24:14	12/7/2001	26.8	1.6	25.2	7642081.9	689886.3	45.538186	-122.685881	4679	8.9	1.1	7	2
74a	2	15:25:09	12/7/2001	26.7	1.6	25.1	7642081.6	689888.6	45.538193	-122.685883	4680	8.9	1.1	7	2
74a	3	15:26:07	12/7/2001	27.1	1.6	25.5	7642092.7	689887.7	45.538191	-122.685839	4684	8.9	1.1	7	2
73b	1	15:32:29	12/7/2001	34.0	1.6	32.4	7641214.9	690858.6	45.540788	-122.689366	4685	8.7	1.3	6	2
73b	2	15:33:19	12/7/2001	34.4	1.6	32.8	7641212.1	690865.7	45.540807	-122.689378	4690	8.6	1.4	6	2
73b	3	15:34:13	12/7/2001	34.5	1.6	32.9	7641204.3	690868.1	45.540813	-122.689409	4691	8.6	1.4	6	2
71b	1	15:43:33	12/7/2001	47.1	1.6	45.5	7640282.4	693563.0	45.548133	-122.693291	4696	8.6	1.4	6	2
71b	2	15:44:32	12/7/2001	46.8	1.6	45.2	7640277.2	693563.0	45.548132	-122.693312	4697	8.6	1.4	6	2
71b	3	15:45:33	12/7/2001	46.9	1.6	45.3	7640271.4	693567.1	45.548143	-122.693335	4702	8.6	1.4	6	2
71b	4	15:49:38	12/7/2001	46.6	1.5	45.1	7640266.2	693563.8	45.548134	-122.693354	4703	8.9	1.1	8	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
70b	1	15:55:38	12/7/2001	47.8	1.5	46.3	7638907.9	694149.8	45.549639	-122.698717	4708	8.6	1.4	7	2
70b	2	15:56:38	12/7/2001	47.8	1.5	46.3	7638896.8	694150.1	45.549639	-122.698760	4709	8.9	1.1	8	2
70b	3	15:57:49	12/7/2001	47.8	1.5	46.3	7638894.6	694132.7	45.549591	-122.698767	4714	8.3	1.7	6	2
70a	1	16:01:49	12/7/2001	44.2	1.5	42.7	7638617.4	693825.6	45.548729	-122.699816	4715	8.2	1.8	5	2
70a	2	16:02:42	12/7/2001	44.4	1.5	42.9	7638625.6	693827.2	45.548733	-122.699784	4720	8.6	1.4	6	2
70a	3	16:03:39	12/7/2001	44.3	1.5	42.8	7638619.5	693827.5	45.548734	-122.699808	4721	8.3	1.7	6	2
68b	1	16:10:26	12/7/2001	24.7	1.5	23.2	7636986.8	694868.9	45.551467	-122.706290	4726	8.7	1.3	7	2
68b	2	16:11:19	12/7/2001	24.4	1.5	22.9	7636990.3	694872.4	45.551477	-122.706276	4727	8.7	1.3	7	2
68b	3	16:12:13	12/7/2001	24.4	1.5	22.9	7636984.4	694867.3	45.551462	-122.706299	4732	7.8	2.2	6	2
68c	1	16:18:22	12/7/2001	59.2	1.4	57.8	7637284.3	695388.4	45.552914	-122.705184	4733	8.7	1.3	6	2
68c	2	16:19:15	12/7/2001	58.6	1.4	57.2	7637275.3	695385.7	45.552905	-122.705219	4738	8.7	1.3	6	2
68c	3	16:20:13	12/7/2001	58.6	1.4	57.2	7637283.9	695378.5	45.552887	-122.705184	4739	8.7	1.3	6	2
67c	1	16:25:58	12/7/2001	42.3	1.4	40.9	7636602.0	695519.0	45.553220	-122.707861	4744	8.7	1.3	6	2
67c	2	16:27:11	12/7/2001	42.1	1.4	40.7	7636617.5	695513.2	45.553206	-122.707800	4745	8.7	1.3	6	2
67c	3	16:28:11	12/7/2001	42.1	1.4	40.7	7636613.2	695512.2	45.553203	-122.707816	4750	8.7	1.3	6	2
67b	1	16:32:04	12/7/2001	21.3	1.4	19.9	7636458.1	695293.2	45.552591	-122.708398	4751	8.4	1.6	5	2
67b	2	16:33:01	12/7/2001	19.6	1.4	18.2	7636459.8	695311.9	45.552642	-122.708393	4756	8.7	1.3	6	2
67b	3	16:33:52	12/7/2001	18.9	1.4	17.5	7636464.2	695318.9	45.552662	-122.708377	4757	8.7	1.3	6	2
66c	1	16:39:09	12/7/2001	52.1	1.4	50.7	7636173.4	696082.0	45.554732	-122.709593	4762	8.7	1.3	6	2
66c	2	16:40:02	12/7/2001	51.9	1.3	50.6	7636169.0	696080.3	45.554727	-122.709610	4763	8.7	1.3	6	2
66c	3	16:41:08	12/7/2001	52.2	1.3	50.9	7636173.1	696082.2	45.554733	-122.709595	4768	8.7	1.3	6	2
65b	1	16:45:42	12/7/2001	25.2	1.3	23.9	7635359.6	695962.6	45.554343	-122.712756	4769	8.7	1.3	6	2
65b	2	16:46:41	12/7/2001	25.1	1.3	23.8	7635355.6	695958.2	45.554331	-122.712772	4774	8.6	1.4	6	2
65b	3	16:47:32	12/7/2001	25.1	1.3	23.8	7635353.1	695960.0	45.554336	-122.712781	4775	8.6	1.4	6	2
64a	1	16:52:07	12/7/2001	33.4	1.3	32.1	7634704.3	696103.3	45.554680	-122.715328	4780	8.6	1.4	6	2
64a	2	16:52:57	12/7/2001	33.3	1.3	32.0	7634703.5	696103.7	45.554681	-122.715332	4786	8.6	1.4	6	2
64a	3	16:53:56	12/7/2001	33.2	1.3	31.9	7634702.6	696102.2	45.554677	-122.715335	4787	8.6	1.4	5	2
64b	1	16:59:07	12/7/2001	46.8	1.3	45.5	7635092.8	696685.4	45.556305	-122.713875	4792	8.6	1.4	5	2
64b	2	17:00:04	12/7/2001	46.9	1.3	45.6	7635100.4	696670.1	45.556264	-122.713844	4793	8.6	1.4	5	2
64b	3	17:01:04	12/7/2001	46.9	1.3	45.6	7635104.1	696668.2	45.556259	-122.713829	4798	8.6	1.4	5	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
63b	1	17:05:18	12/7/2001	36.9	1.3	35.6	7634367.2	696784.3	45.556522	-122.716717	4799	8.5	1.5	5	2
63b	2	17:06:31	12/7/2001	37.0	1.3	35.7	7634354.8	696790.1	45.556537	-122.716766	4804	8.5	1.5	5	2
63b	3	17:07:31	12/7/2001	37.0	1.3	35.7	7634364.6	696786.3	45.556527	-122.716727	4805	8.5	1.5	5	2
60b	1	17:13:46	12/7/2001	28.7	1.2	27.5	7632395.9	697739.3	45.558991	-122.724513	4810	8.5	1.5	6	2
60b	2	17:14:40	12/7/2001	28.9	1.2	27.7	7632394.5	697747.9	45.559015	-122.724519	4811	8.5	1.5	6	2
60b	3	17:15:40	12/7/2001	29.9	1.2	28.7	7632408.4	697750.2	45.559022	-122.724465	4816	8.4	1.6	5	2
57b	1	17:22:51	12/7/2001	32.0	1.2	30.8	7631011.2	699088.9	45.562587	-122.730062	4817	8.3	1.7	5	2
57b	2	17:23:36	12/7/2001	32.2	1.2	31.0	7631015.7	699092.4	45.562597	-122.730045	4822	8.3	1.7	5	2
57b	3	17:24:30	12/7/2001	32.2	1.2	31.0	7631010.4	699090.5	45.562591	-122.730066	4823	8.3	1.7	5	2
55b	1	17:32:56	12/7/2001	45.9	1.2	44.7	7630308.1	700283.9	45.565810	-122.732935	4828	8.2	1.8	5	2
55b	2	17:33:52	12/7/2001	46.0	1.2	44.8	7630303.9	700282.5	45.565806	-122.732951	4829	8.2	1.8	5	2
55b	3	17:34:48	12/7/2001	46.0	1.2	44.8	7630301.3	700284.6	45.565811	-122.732962	4834	8.2	1.8	5	2
52b	1	17:41:16	12/7/2001	21.5	1.1	20.4	7628750.7	701526.4	45.569098	-122.739149	4835	8.6	1.4	6	2
52b	2	17:42:08	12/7/2001	20.9	1.1	19.8	7628753.4	701524.3	45.569092	-122.739138	4840	8.1	1.9	5	2
52b	3	17:43:04	12/7/2001	20.8	1.1	19.7	7628753.9	701521.5	45.569085	-122.739136	4843	8.0	2.0	5	2
14d	1	8:05:49	12/10/2001	51.2	0.8	50.4	7616283.7	722309.1	45.625116	-122.790111	4847	8.5	1.5	6	2
14d	2	8:06:44	12/10/2001	51.2	0.8	50.4	7616286.7	722308.3	45.625114	-122.790100	4852	8.8	1.2	7	2
14d	3	8:07:36	12/10/2001	51.3	0.7	50.6	7616286.1	722308.4	45.625114	-122.790102	4853	8.5	1.5	6	2
14c	1	8:11:34	12/10/2001	56.9	0.7	56.2	7615945.8	722337.5	45.625168	-122.791435	4858	8.5	1.5	6	2
14c	2	8:12:29	12/10/2001	56.7	0.7	56.0	7615954.6	722339.8	45.625175	-122.791401	4859	8.8	1.2	7	2
14c	3	8:13:33	12/10/2001	56.8	0.7	56.1	7615947.7	722341.8	45.625180	-122.791428	4864	8.8	1.2	7	2
10d	1	8:20:54	12/10/2001	51.7	0.7	51.0	7617505.8	725736.2	45.634606	-122.785715	4865	8.6	1.4	6	2
10d	2	8:21:53	12/10/2001	51.8	0.7	51.1	7617508.2	725736.8	45.634608	-122.785706	4870	8.8	1.2	7	2
10d	3	8:22:48	12/10/2001	51.8	0.7	51.1	7617506.3	725739.7	45.634616	-122.785714	4871	8.8	1.2	7	2
9e	1	8:27:42	12/10/2001	47.8	0.7	47.1	7618183.6	726261.5	45.636099	-122.783124	4876	8.8	1.2	7	2
9e	2	8:28:45	12/10/2001	47.7	0.7	47.0	7618184.9	726268.4	45.636118	-122.783120	4877	8.8	1.2	7	2
9e	3	8:29:41	12/10/2001	49.1	0.7	48.4	7618177.4	726271.7	45.636126	-122.783150	4882	8.8	1.2	7	2
9f	1	8:33:45	12/10/2001	13.9	0.7	13.2	7618423.7	725937.2	45.635228	-122.782151	4883	8.8	1.2	7	2
9f	2	8:34:41	12/10/2001	14.1	0.7	13.4	7618424.2	725942.3	45.635243	-122.782149	4888	8.8	1.2	7	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time hh:mm:ss	Date mm/dd/yy	Depth Raw (ft)	Pred Tide (ft)	Depth MLLW (ft)	Easting (ft)	Northing (ft)	Latitude dd.dddddd	Longitude ddd.dddddd	Event No.	SNR a	DOP b	No. SVs c	GPS Stat d
9f	3	8:35:34	12/10/2001	14.4	0.7	13.7	7618422.3	725941.2	45.635239	-122.782156	4889	8.8	1.2	7	2
5e	1	8:46:26	12/10/2001	27.2	0.6	26.6	7621466.5	728707.5	45.643058	-122.770564	4894	8.9	1.1	8	2
5e	2	8:48:12	12/10/2001	27.5	0.6	26.9	7621470.4	728697.5	45.643031	-122.770548	4895	8.7	1.3	7	2
5e	3	8:49:27	12/10/2001	27.4	0.6	26.8	7621477.5	728687.5	45.643004	-122.770519	4899	8.7	1.3	7	2
5c	1	8:54:31	12/10/2001	55.7	0.6	55.1	7620888.5	729166.0	45.644271	-122.772873	4900	8.3	1.7	7	2
5c	2	8:55:28	12/10/2001	55.9	0.6	55.3	7620892.8	729156.8	45.644246	-122.772856	4905	9.0	1.0	9	2
5c	3	8:56:26	12/10/2001	55.9	0.6	55.3	7620892.6	729158.5	45.644251	-122.772857	4906	9.0	1.0	9	2
5b	1	9:00:06	12/10/2001	24.9	0.6	24.3	7620469.2	729476.2	45.645089	-122.774546	4911	8.7	1.3	6	2
5b	2	9:01:01	12/10/2001	25.4	0.6	24.8	7620472.8	729472.3	45.645078	-122.774532	4912	8.7	1.3	7	2
5b	3	9:02:00	12/10/2001	25.1	0.6	24.5	7620477.3	729475.9	45.645089	-122.774515	4917	8.8	1.2	7	2
6c	1	9:07:01	12/10/2001	51.3	0.6	50.7	7620068.5	728662.1	45.642826	-122.776023	4918	8.9	1.1	8	2
6c	2	9:07:51	12/10/2001	51.6	0.6	51.0	7620069.8	728662.5	45.642827	-122.776018	4923	8.9	1.1	8	2
6c	3	9:08:44	12/10/2001	51.7	0.6	51.1	7620075.4	728664.0	45.642832	-122.775996	4924	9.1	0.9	9	2
6e	1	9:12:37	12/10/2001	18.9	0.5	18.4	7620605.1	727952.4	45.640922	-122.773848	4929	8.6	1.4	7	2
6e	2	9:13:24	12/10/2001	18.3	0.5	17.8	7620607.4	727957.1	45.640935	-122.773839	4930	8.6	1.4	7	2
6e	3	9:14:19	12/10/2001	19.5	0.5	19.0	7620603.9	727957.7	45.640936	-122.773853	4935	8.6	1.4	7	2
15b	1	9:30:55	12/10/2001	20.9	0.5	20.4	7615421.1	721342.7	45.622400	-122.793375	4936	8.4	1.6	7	2
15b	2	9:31:45	12/10/2001	20.9	0.5	20.4	7615424.5	721344.8	45.622406	-122.793362	4941	8.9	1.1	8	2
15b	3	9:32:35	12/10/2001	20.8	0.5	20.3	7615425.1	721349.7	45.622419	-122.793360	4942	8.9	1.1	8	2
16b	1	9:36:33	12/10/2001	21.5	0.5	21.0	7615580.1	720490.6	45.620076	-122.792659	4947	8.9	1.1	8	2
16b	2	9:37:21	12/10/2001	21.7	0.5	21.2	7615588.9	720483.5	45.620057	-122.792623	4948	8.9	1.1	8	2
16b	3	9:38:09	12/10/2001	21.7	0.5	21.2	7615586.3	720487.7	45.620068	-122.792634	4953	8.9	1.1	8	2
16a	1	9:42:10	12/10/2001	12.0	0.5	11.5	7615158.3	720391.8	45.619772	-122.794296	4954	8.5	1.5	7	2
16a	2	9:42:59	12/10/2001	11.3	0.5	10.8	7615158.2	720394.2	45.619779	-122.794296	4959	8.9	1.1	8	2
16a	3	9:43:53	12/10/2001	11.1	0.5	10.6	7615156.9	720396.6	45.619785	-122.794302	4960	8.9	1.1	8	2
61e	1	10:38:49	12/10/2001	41.1	0.4	40.7	7635311.3	699741.8	45.564701	-122.713349	4974	9.1	0.9	9	2
61e	2	10:39:44	12/10/2001	40.8	0.4	40.4	7635312.8	699742.4	45.564703	-122.713343	4975	8.8	1.2	8	2
61e	3	10:40:41	12/10/2001	41.2	0.4	40.8	7635319.3	699740.1	45.564697	-122.713317	4980	9.1	0.9	9	2

Lower Willamette River Sediment Profile Image Survey - November 27 - December 10, 2001

Station ID		Time/Date		Depth & Tide			Coordinates - NAD 83 Oregon State Plane - North Zone				GPS Ancillary Data				
Station Name	Rep No.	Time	Date	Depth Raw	Pred Tide	Depth MLLW	Easting	Northing	Latitude	Longitude	Event No.	SNR	DOP	No. SVs	GPS Stat
		hh:mm:ss	mm/dd/yy	(ft)	(ft)	(ft)	(ft)	(ft)	dd.dddddd	ddd.dddddd		a	b	c	d

Title Block Notes

a SNR - Signal-to-noise ratio - (larger number means stronger signal)

b DOP - Dilution of Precision - (smaller number means more accurate position calculation)

c No. Svs - Number of satellites (space vehicles) - (larger number generally means more accurate position calculation)

d GPS Stat 0 = No Signal (position error unknown)
1 = Stand Alone Mode (no differential correction; position may be off 0-5 meters)
2 = Differential Mode (typically sub-meter accuracy)

APPENDIX B

SPI Field Log and field log sheets

(This appendix available only as hard copy at this time)

APPENDIX C

SPI SAP/QAPP/HSP

DRAFT REPORT

COMBINED SAMPLING AND ANALYSIS PLAN / QUALITY ASSURANCE PROJECT PLAN FOR THE LOWER WILLAMETTE RIVER SEDIMENT PROFILE IMAGE SURVEY

PORTLAND, OREGON

24 April 2001

Prepared for:

The Lower Willamette Group

Prepared by:

Striplin Environmental Associates, Inc.
222 Kenyon Street NW
Olympia, WA 98502-4553

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

DGPS	Differential Global Positioning System
HSP	Health and Safety Plan
LWG	Lower Willamette Group
QA/QC	Quality Assurance/Quality Control
QAPP	Quality Assurance Project Plan
RI/FS	Remedial Investigation/Feasibility Study
RM	River Mile
RPD	Redox Potential Discontinuity
SAP	Sampling and Analysis Plan
SEA	Striplin Environmental Associates, Inc.
SPI	Sediment Profile Imaging
STA	Sediment Trend Analysis

1.0 INTRODUCTION

This document describes the work plans for a Sediment Profile Imaging (SPI) survey of a portion of the Lower Willamette River (Figure 1). The SPI survey is one element of the Portland Harbor Remedial Investigation/Feasibility Study (RI/FS) Phase I studies that are being conducted by the Lower Willamette Group (LWG). These work plans are submitted to the U.S. Environmental Protection Agency (EPA) in accordance with the requirements of the stipulated agreement between EPA and the LWG.

SPI will be used as a reconnaissance tool to map a variety of benthic features in the Lower Willamette River. The objectives of the SPI survey are to generate/supplement an area-wide understanding of:

- Grain size distributions
- Patterns in physical disturbance
- Benthic community distributions
- Gradients in benthic habitat quality, particularly in nearshore areas

The SPI survey will occur from River Mile (RM) 0 (convergence with the Columbia River) through RM 15 (Ross Island) and will be conducted in May/June 2001.

SPI data will be used to help assess sediment characteristics and patterns of disturbance in the study area, complimenting the Sediment Trend Analysis (STA®) survey that is being conducted by GeoSea Consulting, and providing additional support for the development of the RI/FS Phase II Work Plans. As mapped with the SPI system, a disturbance is defined as any factor that is known to alter benthic community structure. Disturbances can be the result of either anthropogenic (e.g., chemical contamination, dredging) or natural (e.g., sediment deposition or scour) factors.

In addition, the SPI survey will provide gross benthic community characteristics throughout the area. This information will contribute to the development of the conceptual site model for future risk evaluations by providing information on gradients in both general biological conditions and in potential fish forage areas. The SPI data may also help focus future chemical, toxicity, or benthic community sampling and contribute to the selection of reference areas. Finally, SPI survey data can contribute to the interpretation of other types of data (e.g., sediment chemistry, bioassays) particularly in defining and mapping “disturbed” areas.

2.0 OVERVIEW OF SEDIMENT PROFILE IMAGING

The SPI camera system maps benthic conditions in the near-surface sediments (0-20 cm) across broad areas of seafloor, lake, or river bottoms (Rhoads and Germano 1982, 1986). SPI survey data are collected *in situ* by lowering the SPI camera system to the sediment/water interface (Figure 2). An optical prism descends from the camera frame, vertically penetrates up to 20 cm of sediment, and obtains an image of the sediment-water interface in profile. Following the survey, the sediment-profile images are analyzed using an established computer image analysis interpretive protocol (Rhoads and Germano 1982, 1986). The image analysis process involves the measurement and storage of a wide variety of features from each image, including grain-size, erosional or depositional features, the apparent depth of the Redox Potential Discontinuity (RPD) or the biogenically mixed zone, and the presence and general type of benthic infauna (e.g., subsurface deposit feeders vs. suspension feeders). Sediment-profile image acquisition and subsequent computer image analysis of physical, chemical, and biological benthic parameters can be accomplished rapidly (i.e., weeks to a few months), thereby providing a "benthic site walk" of the study area to help focus subsequent sediment sampling.

2.1 PREVIOUS SPI DATA FROM THE LOWER WILLAMETTE

A SPI survey was conducted at the Portland Shipyard in April 1998 (Striplin Environmental Associates, Inc. (SEA) 1998). The SPI data were collected to supplement and aid in the interpretation of sediment chemical and biological data collected at this site during the same period. The objectives of the SPI survey were to evaluate the areal extent of sandblast grit, evaluate physical (erosive/depositional) patterns on the riverbed and map apparent geochemical and ecological gradients. For this 1998 survey, the sediment-profile images were evaluated qualitatively (i.e., without the use of computer digital image analysis methods to be used in the Lower Willamette survey described in this work plan). Nonetheless, distinct gradients in benthic features were evident and the overall results of the survey are summarized below.

The two-day SPI survey consisted of the collection of images from 63 stations and the qualitative image analysis of 165 images. The surveyed area included Swan Island Lagoon, the Portland Shipyard area, including between the berths, the area downstream of the shipyard and Swan Island, and the main river channel adjacent to the shipyard. Benthic features observed and mapped from the images included:

- Surface and buried layers of sandblast grit in and downstream of the shipyard
- Gradients in sediment type and texture ranging from soft, muddy sediments in the lagoon and downstream of Swan Island to firm, sandy sediments in the main river channel
- Alternating bands of fine sand and mud in some sediment-profile images from the main river and the area downstream of Swan Island suggesting alternating periods of high and low energy depositional regimes

- Relatively shallow apparent RPD depths throughout the area and the widespread presence of sedimentary methane, particularly in the inner lagoon

- Relatively long-lived, subsurface benthos in the area immediately bordering and downstream of the shipyard, and near-surface tube-dwellers in the remainder of the surveyed area (i.e., the shipyard itself, Swan Island Lagoon, and much of the Willamette River)

The distribution of these physical, geochemical, and biological benthic features was used to make inferences about the relative levels of benthic "disturbance" in the surveyed area (where disturbance is defined as any factor that alters benthic community structure). Four general benthic regimes were mapped in the Portland Shipyard area based on this survey. These were:

- A physically-dominated Willamette River channel area characterized by relatively coarse-grained material, some bedforms, sand over mud sediment layering, surface dwelling benthos, and relatively shallow apparent RPD depths

- Highly disturbed areas in the main Shipyard, along the shore adjacent to the Coast Guard facility, and in the northeast corner of Swan Island Lagoon characterized by relatively thin RPDs, few subsurface biogenic structures, and some physical disturbance features (e.g., resuspended layers, very fine sands, surface sandblast grit) that appeared to be due to vessel activity

- A relatively stable, low disturbance area downstream of Swan Island characterized by recent, unconsolidated deposits of very fine sands overlying silts, relatively deep RPDs, subsurface biogenic structures, and sedimentary methane

- Moderately disturbed areas throughout most of Swan Island Lagoon and between the Shipyard and the river channel characterized by intermediate RPD levels, but generally lacking evidence of deep-dwelling infauna and with some evidence of physical disturbance (e.g., propwash lag deposits)

The results of the 1998 SPI survey of the Portland Shipyard area illustrate the range and types of benthic information that this survey technique will acquire throughout the lower Willamette River in 2001 as part of the Portland Harbor RI/FS Phase I studies.

3.0 FIELD OPERATIONS AND DATA ANALYSIS

3.1 SURVEY DESIGN AND SAMPLING GRID

SPI images will be obtained from approximately 500 stations in the Lower Willamette River from RM 0 to RM 15.7. Three replicate image sets will be collected at each station. In general, stations will be located along regularly-spaced, cross-river transects (Figure 3a-e). Oregon State Plane, North, NAD 1983/91 geodetic coordinates for the east and west end of each transect are provided in Table 1 and coordinates for the proposed stations are provided in Table 2. The federally maintained navigation channel is subject to regular physical disturbance factors, such as dredging, propeller wash, and bedload sediment transport. As a result, benthic conditions in the federal channel are likely to be less variable than in the nearshore, off-channel areas. Therefore, approximately two-thirds of the SPI stations will be placed in the more heterogeneous, off-channel areas. This sampling strategy also focuses the survey on those portions of the river that are important to juvenile salmonids that are outmigrating during this season (Knutsen and Ward 1992).

The study area has been divided into three subareas with different sampling designs as described below. The densest station grid will be sampled in the main Portland Harbor area (RM 3-9.7), the region that is the focus of the RI. SPI data from this area may contribute to the development of RI sampling strategies and may help in the interpretation of other data types. The lower (RM 0-3) and upper (RM 9.7-15.7) river will be sampled at a lower station density. These data will catalog general bottom conditions and habitats in these river segments and may help locate reference sites for the RI. Overall, the SPI survey will provide an inventory of benthic conditions in the Lower Willamette.

Lower River (RM 0 to RM 3): A total of 16 cross-river transects spaced 300 meters apart will be sampled (Figure 3a). On each transect, stations are located at real-time target depth contours (10 and 20 ft isobaths) on both sides of the federal channel and in the channel itself (40+ ft isobaths). Typically, 6 stations will be occupied on each transect. Four stations will be located in the nearshore shallow ($\leq$ 20 ft) areas outside the channel and 2 will be located in the channel ($\geq$ 40 ft) including both toe and mid-channel areas (Figure 4). Because the width of the channel relative to the width of the river varies from place to place, the number of stations per transect is varied somewhat (i.e., fewer stations are designated along transects where the channel occupies a larger proportion of the river). Approximately 90 stations will be occupied in the lower river.

Portland Harbor Area (RM 3 to RM 9.7): A total of 54 cross-river transects spaced 200 meters apart will be sampled in the Portland Harbor Area (Figure 3a-c). As in the lower river, stations are located along each transect at the target depth contours on each side of the federal channel and in the channel itself. Approximately 6 stations are designated on each transect. As in the lower river, 4 stations will generally be located in the nearshore shallow ($\leq$ 20 ft) areas outside the channel and 2 will be located in the channel (> 40 ft) including both toe and mid-channel areas (Figure 4). Because the width of the channel relative to the width of the river varies significantly from place to place along this portion of the river, the number of stations per transect is varied (i.e., fewer stations are included on transects where the channel occupies a

larger proportion of the river). Swan Island Lagoon and other off-river areas will also be sampled. In these areas, stations are randomly staggered along the transects. Approximately 320 stations will be occupied in the Portland Harbor area.

Upper River (RM 9.7 to RM 15.7 - through Ross Island): A total of 24 cross-river transects spaced 400 meters apart will be sampled in the upriver area (Figure 3d-e). As in the other areas, stations are designated along each transect at target depth contours on each side of the federal channel and in the channel itself. The federal channel terminates at RM 11.7. Upriver of this point, stations will be located at target depths by the field crew based on the vessel's sonic depth finder readings. Generally, 4 stations will be occupied on each transect, with up to 3 placed in the nearshore shallow (< 20 ft) areas and one located in the channel or a relatively deep mid-river location. Several stations will also be located in Ross Island lagoon. The lagoon has been well-studied in recent years by the Port of Portland and the SPI results generated by this study will therefore be directly compared with other types of benthic data (e.g., sediment chemistry and toxicity). A total of approximately 90 stations will be occupied in the upper river.

3.2 FIELD OPERATIONS

3.2.1 Camera Operation

A Benthos Model 3731-A Sediment Profile Camera (Benthos, Inc., North Falmouth, MA) will be used to collect all sediment-profile images (Figure 2). The Benthos camera is designed to acquire two images per deployment, one at 5 seconds after the camera contacts the sediment and another 20 seconds after sediment contact. Acquisition of multiple images as the camera penetrates the sediment ensures that useful information is gathered even in the event of camera over-penetration.

To acquire data at a SPI station, the vessel is piloted to the location and the camera is deployed outboard. The SPI camera is then lowered and suspended just above the bottom while the water depth and the vessel's position are verified. Once confirmed that the vessel is within 50 ft of the designated target, the camera is lowered to the river bottom and an image set collected. In general, two replicate image sets (within 50 ft of the target location) will be collected at each station to ensure the acquisition of a useable image at each location and provide some indication of small-scale variability.

The field crew will record observations and pertinent information at each sampling station in a SPI field log. Information recorded on the field log data sheets (Figure 5) will include personnel, date, station, time, water depth, camera frame count (to verify proper film advancement), and prism penetration based on the camera frame's penetration indicator. Following film development, typically at the end of each day, a quick assessment of the acceptability (e.g., adequate penetration, proper camera function, good film processing) of each image will be made and noted on the log sheets. This will allow the field crew to reoccupy any stations where an optimal image was not obtained and adjust sampling methods as needed (e.g., add or remove weights on camera) on the following survey day.

3.2.2 Positioning

A differential global positioning system (DGPS) will be used for precise navigation. DGPS consists of a GPS receiver on the sampling platform and a differential receiver located at a horizontal control point. At the control point, the GPS-derived position is compared with the known horizontal location, offsets or biases are calculated, and the correction factors are transmitted to the GPS receiver located on the sampling vessel. The GPS receiver routes latitude and longitude to an integrated navigation system, which displays the vessel's position in plan-view. Navigation data such as range and bearing from the target sampling location are provided at a user-defined scale to guide the vessel's pilot to the desired location.

Differential GPS can provide accuracies on the order of ±1-5 meters. Positioning accuracies on the order of ±1-3 meters will be achieved by avoiding periods when the signal is weak. Weak signals can result from proximity to large ships or other structures. If possible, sampling at locations where the GPS signal is weak will be postponed until nearby ship traffic clears and the signal improves. Proposed geodetic coordinates (Oregon State Plane, North, NAD 1983/91) for each sampling station are provided in Table 2.

The following quality assurance/quality control (QA/QC) procedures will be followed to ensure precise and accurate positioning:

- Setup procedures for the navigation system will be established and followed aboard the research vessel to ensure that the antennas are always in the same location.

- To verify accurate horizontal control, a known position will be occupied daily, prior to survey operations. A log will be kept of the daily fixes to identify any errors in the navigation system.

- Each day before field operations, the navigator will check the system’s hardware and software to make sure the computer, peripherals, and diskettes are functional.

- A proper supply of electronic and mechanical spare parts will be maintained on shore and aboard the research vessel to ensure minimal downtime.

3.2.3 Sampling Vessel

The R/V NANCY ANNE will be used to deploy the SPI camera. This vessel is a 36 ft shallow draft catamaran with a 2,000 lb capacity winch. It is powered by twin 120 hp Volvo stern drives. The R/V NANCY ANNE is owned and operated by Marine Sampling Services, Burly, WA.

3.2.4 SPI Image Collection QA/QC

The SPI Chief Field Scientist is responsible for mobilizing and operating the camera, maintaining the SPI field log, verifying vessel navigation accuracy, following and, if warranted based on site conditions, adjusting the SPI survey plan, and following SPI sampling procedures.

The SPI Field Scientist is also responsible for image review at the end of each survey day to ensure image quality and, if necessary, re-direct the sample plan for the following survey day.

The following QA/QC procedures will be followed when deploying the SPI camera and collecting sediment-profile images.

1. Prior to mobilization of the SPI equipment to the field site, the primary and back-up cameras are bench tested to ensure that the cameras are working properly and that settings (e.g., focus) are optimal. The spare parts and tool kits are checked and batteries are fully charged. Film and other expendables are acquired.

2. At the beginning of each survey day, the time on the SPI camera data display is synchronized with the internal clock on the computerized navigation system being used to conduct the survey. Each SPI station replicate is identified by the time recorded on the film and on disk along with vessel position. The field crew keeps redundant sample logs. Test photos are taken on deck at the beginning of the day and at periodic intervals throughout the day to verify that all internal electronic systems are working.

3. After deployment of the camera at each station, the frame counter is checked to make sure that the requisite number of replicates has been taken. In addition, a prism penetration depth indicator on the camera frame is checked to see that the optical prism has actually penetrated the bottom to a sufficient depth to acquire a profile image. If images have been missed (frame counter indicator) or the penetration depth is insufficient (penetration indicator), additional replicates are taken (following the addition of extra weights, if warranted).

4. Film is developed at the end of every survey day to verify successful data acquisition; strict controls are maintained for development temperatures, times, and chemicals to ensure consistent density on the film emulsion so as to minimize interpretive error by the computer-image analysis system. The film is then visually inspected under magnification. Any images that are of insufficient quality for image analysis are noted, and the sampling locations can be reoccupied on the next survey day, if warranted.

3.3 IMAGE ANALYSIS

In general, one replicate image will be analyzed from each station. The image analyst will select the best quality (e.g., deepest penetration) image from each pair of station replicates for full computer image analysis. If the two replicates vary notably in character from the selected replicate, the analyst will note this in the image analysis log. Both replicates may be analyzed at stations with notable intra-station heterogeneity.

Measurements of physical and biological SPI parameters will be made both visually and using a computerized image analysis program. Color SPI slides will be scanned into photo-cd format (*.pcd) at five different resolutions. Digital images of the SPI slides will be balanced for intensity and color saturation and then imported in SPSS Science SigmaScan Pro® 5.0 for analysis. During each computer analysis session, the image analysis system will be calibrated to

a known scale. SPI parameters to be measured for this survey include: prism penetration depth (mean, minimum, and maximum), sediment grain size major mode and range, boundary roughness (i.e., extent of surface relief), number and size of mud clasts, depth of the apparent RPD (mean, minimum, and maximum), sedimentary methane (number and area of voids), and the infaunal successional stage, as defined in Rhoads and Germano (1982). An experienced SPI scientist will conduct the image analysis. Upon completion of image analysis, a senior SPI scientist will conduct a QA/QC review to ensure quality and accuracy. This QA/QC step consists of a review of all measured parameters on 100% of the images. Parameters that require reassessment based on the senior SPI scientist's expertise are flagged and remeasured by the original image analyst. This process is repeated until the senior SPI scientist approves all data. The specific measurement protocols and interpretive criteria for the SPI parameters are discussed below.

3.3.1 Prism Penetration Depth

The prism pentration depth is determined by digitizing the area of the sediment column and dividing the area by the width of the image. This measurement represents the average depth of penetration of the SPI camera prism into the sediment column. In addition, the maximum and minimum penetration depth are measured. If the weight of the descending camera prism is fixed throughout a survey, differences in penetration depths across the survey area provide a relative measure of sediment-water content (porosity) and shear strength. If the weight loaded on the camera frame is varied during the field survey to optimize penetration, then this is noted on the data analysis worksheet (Figure 5) and taken into account during the data evaluation process.

3.3.2 Boundary Roughness

Boundary roughness is measured as the difference between the maximum and minimum depths of penetration. When apparent, surface relief is designated as being derived from either physical (e.g., sand ripples) or biological processes (e.g., feeding pockets). Boundary roughness values can be indicative of bedform heights or the relief of biogenic structures such as fecal mounds or surface burrows.

3.3.3 Sediment Type and Grain-Size

Using SPI, grain size is reported as the grain size major-mode. The grain size major-mode is the grain size class that comprises the largest percentage of the optical sample. Grain-size major mode is measured from the SPI images by overlaying a template of known grain-size ranges and matching the sediment grain-size in the SPI images to the closest fraction in the template. Grain-size ranges are reported as phi units and grain size ranges consist of: ≥4, 4-3, 3-2, 2-1, 1-0, etc. phi size fractions. The limit of this optical technique for differentiating individual grains is approximately 0.062 mm (4 phi), which corresponds to the break between very fine sand and silt. Using this technique, silts and clays are combined as the ≥4 phi fraction because particles >4 phi (silts and finer) cannot be optically differentiated.

3.3.4 Apparent Redox Potential Discontinuity (RPD) Depth

Oxidized sediments at the sediment-water interface have a higher reflectance, and frequently a different color, than underlying reduced sediments. Typically, oxidized sediments exist as a thin surface band of olive to tan sediment overlying reduced grey to black sediment at depth. Rhoads (1974) noted that in the absence of bioturbating benthic infauna in marine muds, the high reflectance layer persists only 2-3 mm downward into the sediment from the sediment-water interface. The supply of oxygen to non-bioturbated sediment is controlled by Fickian diffusion. In the presence of bioturbating macrofauna, RPDs may be considerably deeper as the infauna physically mix and irrigate the sediments to depth as they burrow and feed. Infauna mix surface ferric oxide-hydroxide coated particles downward into the sediment column, below the actual RPD or $E_H = 0$ horizon, and these oxidized coatings persist for some time in the reducing, subsurface sediment environment. Consequently, the thickness of the oxide-coated particle layer evident in SPI images is referred to and measured as the *apparent* RPD. The apparent RPD is measured as the average thickness of this surface band of oxidized sediments across the entire width of the SPI image. In addition to the average RPD, minimum and maximum RPD depths are also measured.

An assumption made in measuring apparent RPD depths in SPI images is that, given the complexities of iron and sulfate reduction-oxidation chemistry, reddish-brown or lighter sediment color tones (Diaz and Schaffner 1988, Rhoads and Germano 1986) are indications that the sediments are oxic, or at least are not intensely reducing. This is in accordance with the classical concept of RPD depth, which associates it with sediment color (Fenchel 1969, Vismann 1991). The apparent RPD is an important measure integrating pore water dissolved oxygen conditions, sedimentary organic enrichment, and biogenic mixing rates over time.

Another important characteristic of the apparent RPD is the contrast in reflectance values at its boundary. This contrast is related to the interactions of the degree of organic loading, biogenic or physical sediment mixing, and bottom-water dissolved oxygen content. Inputs of labile organic matter coupled with low water column flushing rates can exceed the system's ability to remineralize the organics and thereby increase sulfate reduction rates (and the abundance of sulfide end-products) (Rhoads and Germano 1986). This results in more highly reduced (lower-reflectance) sediments at depth and higher apparent RPD contrasts. In regions of low RPD contrasts, images with high contrasts can indicate localized sites of high organic-rich material input and/or restricted water-column exchange rates.

The apparent RPD is useful in assessing the quality of a habitat for epifauna and infauna from both physical and biological points of view. The depth of the apparent RPD in sediment-profile images has been shown to be directly correlated to the quality of the benthic habitat in polyhaline and mesohaline estuarine zones (Rhoads and Germano 1986, Revelas et al. 1987, Day et al. 1988, Diaz and Schaffner 1988, and Valente et al. 1992). Controlling for differences in sediment type and physical disturbance factors, thin RPDs (<1 cm) can be indicative of chronic benthic environmental stress or recent major disturbance.

In addition, because the rate of depression and rebound of the apparent RPD is relatively slow (on the order of 200-300 micrometers per day), this parameter has a relatively long time constant and measurable changes in the apparent RPD depth in SPI images can be detected over periods of weeks to months (Germano and Rhoads 1984). Therefore, this parameter is effective for documenting changes (or gradients) that develop over seasonal or annual time-scales related to water temperature, infaunal assemblages, or sediment oxygen demand cycles.

Comparatively few SPI surveys have been conducted in freshwater systems, such as the Lower Willamette River. Fisher (1982) points out, however, that the major geochemical difference between freshwater and marine systems is the paucity of sulfate in freshwater. As a result, sulfate reduction in freshwater is much less important in the remineralization of organic matter than methanogenesis. Nonetheless, sulfate-reducing bacteria are present in freshwater sediments and iron sulfides are important solid phase constituents of the sediment column. The principle sources of the sulfur in most freshwater systems are sulfur-containing organic compounds rather than aqueous sulfate. Regarding the apparent RPD measurement in freshwater sediment-profile images, reducing sedimentary conditions should still be revealed by the presence of low-reflectance (gray to black), iron sulfide-rich sediments. Furthermore, the depth to these dark sediments, assuming the water column is aerobic, should still reflect the interaction between labile organic matter input and biogenic mixing rates (which, in turn, are a function of benthic assemblage type). Finally, subsurface methane formation should be much more widespread in freshwater and may not necessarily be an indicator of severe organic over-enrichment as it is in marine systems (see below).

3.3.5 Sedimentary Methane

As pore-water oxygen, nitrate, and sulfate are depleted in the sediment column, methanogenesis occurs (methane is a by-product of organic matter decomposition when CO_2 is used as the electron acceptor). In sediment-profile images, the process of methanogenesis is detected by the appearance of methane bubbles in the sediment column. The gas-filled voids are readily discernible in SPI photographs because of their irregular or circular aspect and glassy texture (due to the reflection of the strobe off the wall of the gas-filled void). When observed, the number and total area occupied by methane bubbles in the SPI image are measured. The presence of methane in the sediment column can indicate an oxygen-stressed environment. Oxygen stress may be caused by either low dissolved oxygen conditions in the overlying water column, or alternatively, by high sediment oxygen demand associated with bacterial decomposition of organic matter.

Because of the much lower levels of sulfate in freshwater compared to marine systems, methanogenesis occurs more readily in freshwater sediments and methane was observed in numerous SPI images collected at the Portland Shipyard in April 1998 (SEA 1998). In marine systems, abundant methane formation is indicative of severely organically-loaded or oxygen-limited environments. This is not likely the case in a system such as the Lower Willamette. Nevertheless, the distribution and abundance of sedimentary methane in the survey area should reflect relative degrees of organic enrichment.

3.3.6 Infauna Type and Biogenic Structures

There is a recognized sequence of benthic recolonization following both spatial and temporal disturbances in marine, fine-grained (muddy) areas (Pearson and Rosenberg 1978; Rhoads and Germano 1982, 1986). Rhoads and Boyer (1982) describe a generalized sequence in which dense aggregations of near-surface, tube-dwelling infauna recruit to an area immediately following a disturbance and are replaced in time by larger, deeper-dwelling subsurface feeding infauna. Distinctive biogenic features associated with these different infaunal assemblages can be seen in SPI images. This infaunal successional paradigm has helped guide the interpretation of biological features (both benthic organisms and their biogenic structures) observed in sediment profile images and provides a framework for the ecological interpretation of the images in nearshore marine systems (Revelas et al. 1987, Grizzle and Penniman 1991, Valente et al. 1992).

As in marine systems, the activities of freshwater benthos affect sediment textures. However, much less is known about the changes in benthic assemblages that accompany freshwater benthic disturbances. Freshwater sediments are inhabited by a variety of macrobenthos (organisms retained on a 500 μ sieve); these include oligochaetes, amphipods (e.g., *Hyalella*), insect larvae (chironomids), and freshwater bivalves (e.g., unionid clams). The life histories of these types of freshwater infauna have been described (McCall and Tevesz 1982, Fisher 1982) and these parallel marine animal-sediment interrelationships to some extent. For example, some forms, such as chironomid (insect) larvae, construct semi-permanent tube dwellings and feeding burrows that have notable, localized effects on sediment and pore-water characteristics (McCall and Tevesz 1982, Fisher 1982). Also, subsurface deposit feeders, such as tubificid oligochaetes, bioturbate sediments to variable feeding depths. Deep-dwelling mobile infauna, such as unionid clams, can thoroughly mix the top 10 centimeters of the sediment (McCall and Fisher 1980, McCall et al. 1979).

While fewer studies have been conducted in brackish and freshwater systems, information on freshwater benthic responses to disturbance and some non-marine SPI data sets do exist (McCall and Soster 1990; SEA 1997, 1998). Work in Lake Erie suggests that large numbers of ostracods and naid oligochaetes are early post-disturbance colonizers, followed by tube-dwelling chironomids and, later, deeper-dwelling deposit feeding tubicifid oligochaetes (McCall and Tevesz 1982). A SPI survey of Milwaukee Harbor, Wisconsin found that dense aggregations of oligochaetes were associated with areas of organic enrichment related to sewage effluent discharges (Shen and Boyer 1984). A SPI survey adjacent to a former log treating facility and active lumber mill in Lake Washington (Renton, Washington) found dense, oligochaete tube mats concentrated in a transitional zone between nearshore organically enriched areas and offshore ambient lake conditions (SEA 1997). For this survey, the following biogenic structures will be noted and measured in each analyzed image: 1) the number and minimum and maximum depths of feeding pockets or voids; 2) the density (#/cm) of worm tubes at the sediment-water interface; 3) the presence and thickness of fecal pellet layers; and 4) the presence and type of epifauna. The significance of these biogenic features as potential indicators of benthic community function and disturbance history will be documented. However, no attempt will be

made to strictly interpret spatial trends in biological features according to the marine successional stage paradigm described in Rhoads and Germano (1982, 1986).

4.0 DATA REPORT

Following the completion of the image analysis and SPI data mapping, a draft SPI data report will be prepared detailing the results of the survey. At a minimum, this data report will include:

- Narrative descriptions of the data collection and analysis procedures, including any deviations from procedures presented in this work plan
- Maps of key SPI parameters (e.g., grain-size, apparent RPD depths, widespread biogenic structures)
- Appendices containing tabulations of actual station coordinates, all measured SPI parameters, and color reproductions of all images analyzed
- Discussion of the SPI results, including comparisons with other Portland Harbor data sets (e.g., the STA survey), as appropriate

Following the receipt of EPA comments on the draft data report, a final SPI Data Report will be prepared.

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TABLES AND FIGURES

Table 1. Geodetic coordinates for each end of the cross-river transects (page 1 of 3).

	Oregon State Plane, North, NAD 83/91			
	East End		West End	
Transect	Easting	Northing	Easting	Northing
Lower River				
1	7623608.507	731691.633	7622484.539	733042.575
2	7623080.659	731263.137	7622048.623	731850.698
3	7622528.571	730477.645	7621541.383	731028.105
4	7621983.566	729589.208	7620961.464	730339.340
5	7621494.828	728679.621	7620355.399	729561.721
6	7620619.706	727945.155	7619767.144	729049.159
7	7619873.433	727311.492	7618995.696	728488.888
8	7619109.335	726637.480	7618146.209	727971.748
9	7618465.121	725906.321	7617238.816	727485.919
10	7618046.726	725325.744	7616374.311	726572.156
11	7617597.461	724455.147	7615815.220	725784.480
12	7617349.878	723842.523	7615341.619	724599.788
13	7617127.953	723212.503	7615071.606	723413.630
14	7616975.118	722266.993	7614965.888	722389.286
15	7616859.645	721481.138	7614951.783	721301.450
16	7616904.393	720750.825	7614815.244	720331.882
Portland Harbor Area				
17	7616933.859	720054.826	7614727.735	719597.191
18	7617069.894	719422.820	7615105.452	719023.594
19	7617212.739	718743.768	7615434.225	718391.191
20	7617503.958	718131.296	7615820.122	717786.254
21	7617803.751	717524.096	7616037.468	717175.206
22	7619930.606	717274.172	7616326.367	716561.177
23	7618217.873	716397.030	7616525.090	715885.472
24	7618434.567	715939.550	7616732.487	715199.385
25	7618713.870	715350.437	7617072.849	714616.331
26	7618829.142	714713.224	7617325.548	714009.679
27	7620305.422	714637.147	7617551.107	713410.474
28	7619718.795	713722.853	7617989.692	712888.111
29	7620280.749	713442.934	7618194.856	712210.584
30	7619921.213	712471.333	7618525.860	711625.655
31	7620139.103	711845.045	7618866.360	711082.945
32	7620497.858	711428.860	7619242.196	710488.919
33	7620825.886	710822.786	7619653.078	709943.640

Table 1. Geodetic coordinates for each end of the cross-river transects (page 2 of 3).

	Oregon State Plane, North, NAD 83/91			
	East End		West End	
Transect	Easting	Northing	Easting	Northing
34	7621140.287	710249.884	7620071.542	709438.603
35	7621460.059	709706.971	7620456.826	708939.876
36	7621792.225	709143.759	7620954.008	708487.600
37	7622255.454	708659.800	7621298.706	707906.391
38	7622619.056	708242.640	7621794.558	707377.880
39	7623117.780	707799.328	7622152.438	706763.902
40	7623529.985	707357.135	7622469.796	706229.337
41	7623958.211	707076.260	7623295.271	705961.167
42	7624518.673	706734.299	7623855.469	705615.735
43	7625076.607	706390.253	7624406.245	705301.486
44	7625670.519	706081.504	7625011.146	704974.538
45	7626317.712	705934.697	7625551.638	704639.388
46	7627083.657	705838.644	7626076.805	704282.762
47	7627375.650	704855.297	7626389.570	703758.156
48	7628169.648	704688.761	7626812.984	703302.943
49	7628726.669	704312.528	7627295.928	702849.440
50	7628967.231	703618.670	7627839.008	702451.302
51	7629628.107	703342.238	7628284.947	701933.892
52	7629955.254	702746.359	7628314.467	701058.494
53	7630444.902	702316.230	7628658.704	700477.841
54	7630989.499	701911.355	7629100.756	699978.922
55	7631640.160	701674.384	7629946.238	699920.068
56	7632841.501	701984.769	7630379.987	699418.959
57	7633610.748	701868.681	7630841.346	698936.621
58	7634094.568	701388.073	7631274.249	698463.211
59	7634613.479	701015.105	7631478.730	697746.192
60	7635059.419	700488.085	7631984.004	697304.267
61	7635618.871	700034.038	7632627.032	697059.596
62	7636064.811	699669.178	7633206.485	696735.163
63	7636510.750	699490.802	7634091.407	696411.661
64	7636810.746	699215.130	7634616.654	695978.885
65	7636040.487	697082.727	7635179.560	695673.026
66	7636618.463	696811.319	7635720.490	695364.987
67	7637150.223	696421.186	7636298.506	695010.680
68	7637701.913	696085.599	7636865.274	694690.160

Table 1. Geodetic coordinates for each end of the cross-river transects (page 3 of 3).

	Oregon State Plane, North, NAD 83/91			
	East End		West End	
Transect	Easting	Northing	Easting	Northing
69	7638290.342	695720.328	7637199.796	693964.714
Upper River				
70	7639678.542	694989.270	7638591.535	693793.608
71	7640416.037	693696.981	7639536.648	692888.586
72	7641144.845	692599.982	7640342.156	691871.096
73	7641953.519	691561.065	7640789.368	690493.349
74	7642783.025	690537.523	7642070.349	689877.535
75	7643796.112	689725.767	7642938.082	688924.208
76	7644778.579	688814.871	7643928.621	688036.896
77	7645466.660	687617.420	7644806.218	687145.374
78	7646209.533	686458.508	7645706.053	686109.284
79	7647091.593	685426.605	7646131.657	684942.272
80	7646951.749	683779.498	7646152.917	683879.638
81	7646641.153	682457.098	7645733.337	682710.106
82	7646360.065	681195.281	7645253.467	681494.305
83	7646377.410	680185.613	7644990.804	679733.491
84	7646657.239	678905.022	7645481.904	678525.725
85	7647225.387	677731.042	7645980.544	677309.282
86	7647965.941	676230.320	7646432.137	676092.518
87	7648257.868	674642.199	7646373.358	675050.180
88	7648570.816	672980.036	7646125.796	673780.067
89	7649735.287	671858.426	7645635.340	672532.037
90	7650018.422	671089.685	7645097.794	671181.044
91	7649988.152	670269.172	7645131.083	669788.453
92	7648804.059	667576.360	7645361.362	667198.506
93	7649479.367	669101.134	7645379.650	668466.261

Table 2. Proposed geodetic coordinates for each sampling station (page 1 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
Lower River		
01a	7622520.513	733000.262
01b	7622553.846	732955.818
01c	7622814.958	732655.818
01d	7623148.291	732250.262
01e	7623364.958	731983.596
01f	7623426.069	731922.485
02a	7622048.291	731850.262
02b	7622120.513	731811.374
02c	7622320.513	731689.151
02d	7622626.069	731522.485
02e	7622959.402	731333.596
02f	7623026.069	731294.707
03a	7621598.291	730989.151
03b	7621681.624	730950.262
03c	7622037.180	730750.262
03d	7622298.291	730611.374
03e	7622442.735	730528.040
03f	7622503.846	730494.707
04a	7621009.402	730311.374
04b	7621114.958	730228.040
04c	7621337.180	730066.929
04d	7621626.069	729855.818
04e	7621937.180	729628.040
05a	7620381.624	729533.596
05b	7620470.513	729472.485
05c	7620892.735	729155.818
05d	7621348.291	728789.151
05e	7621476.069	728711.374
06a	7619842.735	728939.151
06b	7619920.513	728855.818
06c	7620070.513	728655.818
06d	7620226.069	728455.818
06e	7620598.291	727961.374
07a	7619081.624	728383.596
07b	7619142.735	728294.707
07c	7619437.180	727883.596
07d	7619737.180	727505.818

Table 2. Proposed geodetic coordinates for each sampling station (page 2 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
07e	7619847.873	727339.708
08a	7618203.846	727889.151
08b	7618298.291	727766.929
08c	7618476.069	727522.485
08d	7618637.180	727300.262
08e	7619025.651	726762.070
08f	7619070.095	726683.596
09a	7617303.846	727400.262
09b	7617392.735	727283.596
09c	7617470.513	727178.040
09d	7617831.624	726711.374
09e	7618181.624	726272.485
09f	7618431.067	725945.403
10a	7616414.957	726544.707
10b	7616520.513	726461.374
10c	7617037.180	726083.596
10d	7617503.846	725733.596
10e	7617921.569	725419.929
10f	7618019.538	725339.430
11a	7615976.069	725666.929
11b	7616081.624	725578.040
11c	7616392.735	725355.818
11d	7616698.291	725122.485
11e	7617383.868	724623.885
11f	7617543.500	724491.366
12a	7615498.291	724539.151
12b	7615648.291	724483.596
12c	7616314.957	724233.596
12d	7616509.402	724155.818
12e	7617071.655	723950.694
12f	7617299.534	723861.119
13a	7615270.513	723389.151
13b	7615392.735	723383.596
13c	7615709.402	723355.818
13d	7616098.291	723311.374
13e	7616829.103	723244.036
13f	7617048.791	723217.319
14a	7615203.846	722372.485

Table 2. Proposed geodetic coordinates for each sampling station (page 3 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
14b	7615320.513	722372.485
14c	7615953.846	722333.596
14d	7616281.624	722311.374
14e	7616689.961	722286.178
14f	7616886.146	722275.337
15a	7615303.846	721339.151
15b	7615431.624	721344.707
15c	7615681.624	721366.929
15d	7616003.846	721400.262
15e	7616587.260	721458.652
15f	7616750.609	721475.670
16a	7615303.846	720444.707
16b	7615592.735	720489.151
16c	7616031.624	720578.040
16d	7616464.957	720666.929
16e	7616792.457	720727.901
Portland Harbor Area		
17a	7615031.624	719655.818
17b	7615331.624	719722.485
17c	7615976.069	719850.262
17d	7616614.957	719994.707
17e	7616892.457	720044.568
18a	7615342.735	719072.485
18b	7615526.069	719100.262
18c	7616053.846	719216.929
18d	7616459.402	719300.262
18e	7616883.204	719383.045
18f	7617014.906	719408.732
19a	7615570.513	718411.373
19b	7615687.180	718439.151
19c	7616498.291	718605.818
19d	7616920.513	718689.151
19e	7617187.180	718739.151
20a	7615931.624	717811.373
20b	7616353.846	717889.151
20c	7616776.069	717978.040
20d	7617330.642	718102.154
20e	7617448.624	718127.908

Table 2. Proposed geodetic coordinates for each sampling station (page 4 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
21a	7616137.180	717189.151
21b	7616220.513	717205.818
21c	7616914.957	717355.818
21d	7617470.513	717455.818
21e	7617703.846	717500.262
21f	7617753.846	717511.373
22a	7616437.180	716583.596
22b	7616626.069	716616.929
22c	7617381.624	716772.485
22d	7617937.180	716878.040
22e	7618471.944	717311.822
22f	7619062.787	717101.133
22g	7619612.410	717215.638
23a	7616643.406	715915.708
23b	7616737.180	715939.151
23c	7617353.846	716133.596
23d	7617981.624	716322.485
23e	7618159.402	716383.596
24a	7616876.069	715266.929
24b	7616959.402	715305.818
24c	7617253.846	715422.485
24d	7617803.846	715661.373
24e	7618292.735	715872.485
25a	7617223.406	714680.719
25b	7617883.353	714969.125
25c	7617492.735	714094.707
25d	7618479.691	715249.886
25e	7617787.180	714233.596
25f	7618632.159	715315.446
25g	7618309.402	714478.040
25h	7618781.624	714694.707
26a	7617414.957	714061.373
26b	7617657.794	713444.831
26c	7617784.231	713505.271
26d	7618345.342	713766.382
26e	7618723.120	713938.605
26f	7618984.231	714049.716
26g	7619067.564	714088.605

Table 2. Proposed geodetic coordinates for each sampling station (page 5 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
26h	7619329.802	714457.457
26i	7619697.860	714610.236
26j	7620121.474	714506.069
27a	7618050.738	712916.000
27b	7618117.404	712949.333
27c	7618372.960	713077.111
27d	7618867.404	713310.444
27e	7619367.404	713543.777
27f	7619622.960	713677.111
28a	7618289.626	712266.000
28b	7618356.293	712299.333
28c	7618900.738	712632.666
28d	7619428.515	712943.777
28e	7619622.960	713049.333
28f	7619834.071	713182.666
28g	7620200.738	713388.222
29a	7618628.515	711682.666
29b	7618706.293	711732.666
29c	7619017.404	711927.111
29d	7619361.849	712138.222
29e	7619822.960	712410.444
30a	7618969.916	711145.680
30b	7619028.377	711178.418
30c	7619287.945	711332.756
30d	7619769.667	711622.724
30e	7620127.450	711837.862
31a	7619347.385	710563.966
31b	7619864.051	710952.855
31c	7620314.051	711297.300
31d	7620447.385	711397.300
32a	7619736.273	710002.855
32b	7619814.051	710058.411
32c	7620152.940	710325.077
32d	7620652.940	710702.855
33a	7620136.273	709480.633
33b	7620408.496	709697.300
33c	7620758.496	709958.411
33d	7621102.940	710213.966

Table 2. Proposed geodetic coordinates for each sampling station (page 6 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
34a	7620480.718	708958.411
34b	7620558.496	709013.966
34c	7620964.051	709336.189
34d	7621302.940	709591.744
34e	7621408.496	709675.077
35a	7620975.162	708513.966
35b	7621214.051	708691.744
35c	7621530.718	708936.189
35d	7621775.162	709130.633
36a	7621336.273	707936.189
36b	7621441.829	708013.966
36c	7621797.385	708297.300
36d	7622175.162	708602.855
36e	7622230.718	708647.300
37a	7621825.162	707413.966
37b	7621886.273	707491.744
37c	7622097.385	707713.966
37d	7622502.940	708136.189
37e	7622591.829	708202.855
38a	7622219.607	706813.966
38b	7622280.718	706886.189
38c	7622497.385	707136.189
38d	7622802.940	707452.855
38e	7623052.940	707719.522
38f	7623080.718	707813.966
39a	7622636.273	706413.966
39b	7622741.829	706519.522
39c	7622852.940	706647.300
39d	7623152.940	706952.855
39e	7623502.940	707330.633
40a	7623336.273	706019.522
40b	7623547.385	706375.077
40c	7623702.940	706630.633
40d	7623902.940	706980.633
41a	7623897.385	705680.633
41b	7623941.829	705763.966
41c	7624191.829	706169.522
41d	7624447.385	706625.077

Table 2. Proposed geodetic coordinates for each sampling station (page 7 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
41e	7624497.385	706702.855
42a	7624436.274	705347.300
42b	7624486.274	705436.189
42c	7624664.051	705713.966
42d	7624814.051	705963.966
42e	7625011.425	706280.937
43a	7625047.385	705036.189
43b	7625180.718	705247.300
43c	7625347.385	705530.633
43d	7625610.550	705988.243
43e	7625063.942	706354.510
44a	7625575.162	704675.077
44b	7625647.385	704797.300
44c	7625941.829	705286.189
44d	7626241.829	705797.300
44e	7626286.274	705891.744
44f	7625655.579	706058.691
45a	7626108.496	704325.077
45b	7626152.940	704397.300
45c	7626258.496	704552.855
45d	7626441.829	704836.189
45e	7626997.385	705691.744
45f	7627052.940	705780.633
46a	7626530.718	703891.744
46b	7626591.829	703975.077
46c	7626891.829	704286.188
46d	7627047.385	704475.077
46e	7627341.829	704808.411
47a	7626952.930	703443.529
47b	7627030.708	703521.307
47c	7627197.374	703682.418
47d	7627558.485	704049.085
47e	7627941.819	704454.640
47f	7628041.819	704554.640
48a	7627386.263	702937.974
48b	7627469.597	703026.863
48c	7627591.819	703143.529
48d	7627914.041	703482.418

Table 2. Proposed geodetic coordinates for each sampling station (page 8 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
48e	7628464.041	704037.974
48f	7628552.930	704126.863
49a	7627897.374	702510.196
49b	7627975.152	702576.863
49c	7628302.930	702921.307
49d	7628502.930	703143.529
49e	7628952.930	703604.640
50a	7628330.708	701965.752
50b	7628386.263	702037.974
50c	7628569.597	702215.752
50d	7628952.930	702626.863
50e	7629430.708	703132.418
50f	7629514.041	703215.752
51a	7628636.263	701382.418
51b	7628758.485	701526.863
51c	7629130.708	701904.640
51d	7629452.930	702232.418
51e	7629891.819	702704.640
52a	7628691.819	700499.085
52b	7628758.485	700560.196
52c	7629225.152	701060.196
52d	7629830.708	701687.974
52e	7630397.374	702265.752
53a	7629264.041	700154.640
53b	7629497.374	700382.418
53c	7630047.374	700932.418
53d	7630891.819	701799.085
53e	7630958.485	701871.307
54a	7629997.374	699960.196
54b	7630302.930	700276.863
54c	7631069.597	701076.863
54d	7631552.930	701576.863
54e	7631619.597	701649.085
55a	7630447.374	699482.418
55b	7630530.708	699560.196
55c	7631114.041	700187.974
55d	7632130.708	701254.640
55e	7632302.930	701421.307

Table 2. Proposed geodetic coordinates for each sampling station (page 9 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
55f	7632725.152	701854.640
56a	7630908.485	699004.640
56b	7631002.930	699099.085
56c	7631902.930	700049.085
56d	7632247.374	700426.863
56e	7632780.708	700993.529
56f	7633052.930	701276.863
56g	7633502.930	701765.752
57a	7631402.930	698587.974
57b	7631891.819	699093.529
57c	7632375.152	699610.196
57d	7632502.930	699737.974
57e	7633702.930	700982.418
57f	7634030.708	701321.307
58a	7631688.874	697941.492
58b	7631842.871	698119.181
58c	7632121.250	698397.560
58d	7632640.285	698958.688
58e	7632999.401	699323.727
58f	7634261.102	700637.432
59a	7632257.478	697580.191
59b	7632399.629	697734.188
59c	7633015.617	698362.022
59d	7633501.300	698871.397
59e	7634994.592	700412.130
60a	7632784.621	697218.891
60b	7633211.075	697639.421
60c	7633921.830	698356.099
60d	7634105.442	698527.865
60e	7635315.211	699744.334
61a	7633258.458	696786.515
61b	7633382.840	696916.820
61c	7634170.594	697710.496
61d	7634561.509	698131.027
61e	7635987.476	699589.196
62a	7634117.287	696442.983
62b	7634377.898	696774.669
62c	7634928.733	697473.578

Table 2. Proposed geodetic coordinates for each sampling station (page 10 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
62d	7635100.499	697686.805
62e	7636173.642	699072.069
63a	7634679.969	696069.836
63b	7635100.499	696679.901
63c	7635497.337	697230.737
63d	7635556.567	697343.273
63e	7636755.058	699094.159
64a	7635213.035	695732.228
64b	7635349.263	695957.300
64c	7635752.024	696632.518
64d	7636006.712	697041.202
65a	7635787.562	695471.617
65b	7635900.098	695661.152
65c	7636172.555	696093.528
65d	7636468.703	696561.442
65e	7636551.624	696697.670
65f	7636593.085	696768.746
66a	7636344.321	695086.625
66b	7636474.626	695299.852
66c	7636604.931	695519.001
66d	7636877.387	695969.146
66e	7637114.305	696354.139
67a	7636912.925	694766.785
67b	7636978.077	694879.321
67c	7637286.071	695388.696
67d	7637582.219	695886.225
67e	7637665.141	696034.299
68a	7637368.993	694239.642
68b	7637463.760	694387.716
68c	7637564.450	694547.636
68d	7638008.672	695270.237
68e	7638245.591	695643.383
Upper River		
69a	7638618.737	693836.880
69b	7638908.962	694144.874
69c	7639596.026	694903.013
69d	7639661.178	694974.089
70a	7639673.024	693019.512

Table 2. Proposed geodetic coordinates for each sampling station (page 11 of 13).

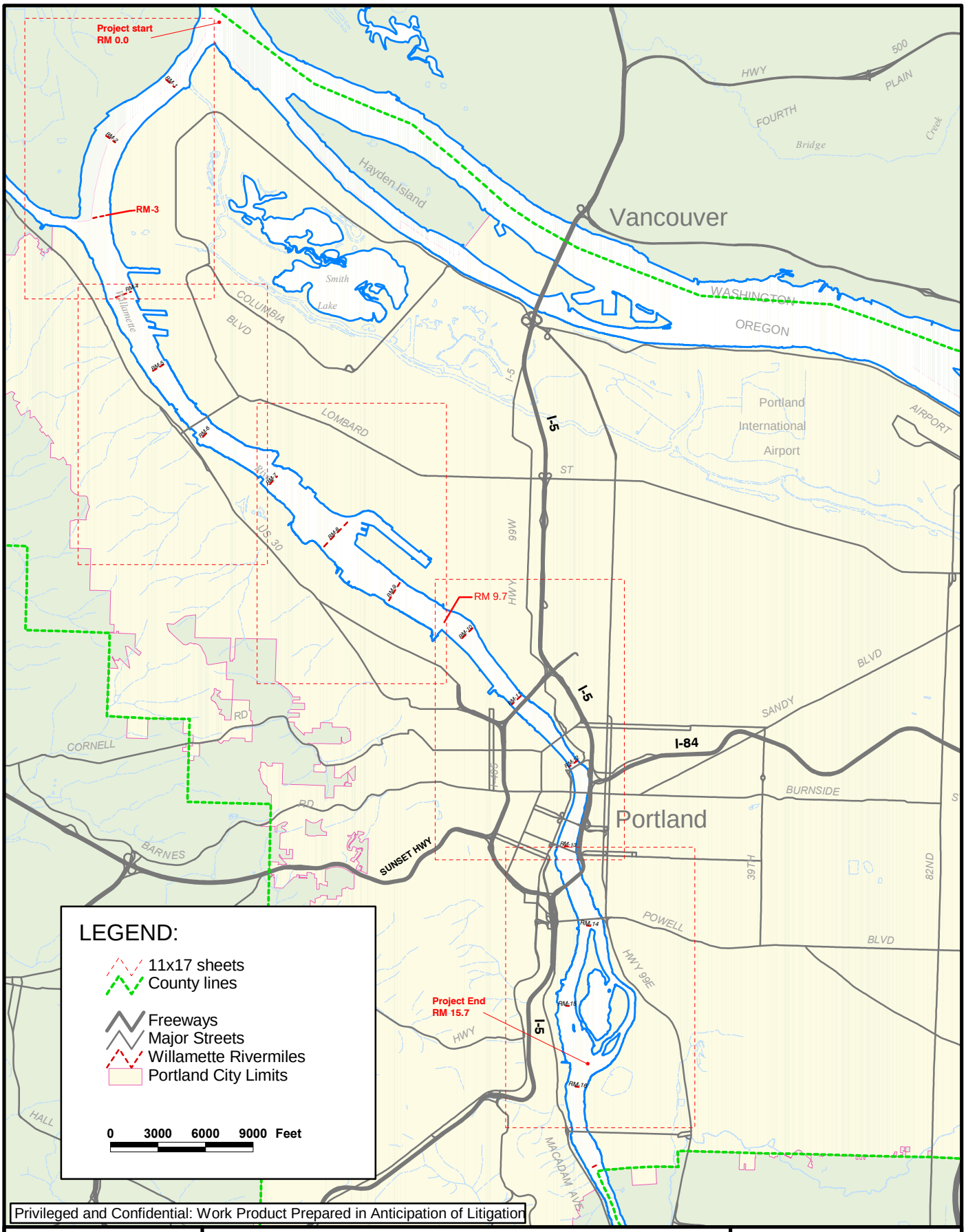
Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
70b	7640277.166	693570.347
70c	7640389.702	693671.038
71a	7640377.856	691905.995
71b	7640751.003	692243.604
71c	7641118.226	692575.290
72a	7641130.072	690810.248
72b	7641207.071	690863.554
72c	7641751.983	691378.852
72d	7641929.672	691538.772
73a	7642095.515	689898.112
73b	7642314.664	690099.493
73c	7642664.119	690431.178
73d	7642758.886	690514.100
74a	7642972.113	688956.361
74b	7643060.957	689027.437
74c	7643404.489	689365.045
74d	7643706.560	689637.502
74e	7643777.636	689708.577
75a	7643955.324	688073.840
75b	7644648.311	688695.751
75c	7644707.540	688749.058
76a	7644837.845	687161.704
76b	7644885.229	687203.165
76c	7645139.916	687374.931
76d	7645376.835	687552.620
77a	7645750.992	686144.992
77b	7645824.868	686198.710
77c	7645958.691	686284.413
77d	7646196.056	686447.836
78a	7646148.724	684950.806
78b	7646341.543	685047.734
78c	7647006.307	685381.314
78d	7647067.429	685412.716
79a	7646176.760	683877.226
79b	7646238.595	683868.096
79c	7646719.206	683808.077
79d	7646930.359	683781.011
80a	7645756.095	682704.712

Table 2. Proposed geodetic coordinates for each sampling station (page 12 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
80b	7645807.440	682690.856
80c	7646478.614	682498.426
80d	7646617.368	682462.297
81a	7645319.425	681475.905
81b	7645640.698	681389.420
81c	7646293.053	681212.212
81d	7646341.520	681202.635
82a	7645034.958	679990.349
82b	7645188.713	679598.651
82c	7645309.607	679384.655
82d	7645362.411	679854.334
82e	7646305.190	680162.269
82f	7646359.471	680181.267
83a	7645534.405	678541.991
83b	7645585.971	678558.275
83c	7646278.050	678780.826
83d	7646644.444	678900.243
84a	7646055.499	677334.246
84b	7646606.448	677521.514
84c	7647116.686	677692.498
84d	7647189.965	677716.925
85a	7646459.098	676092.518
85b	7646617.871	676107.496
85c	7647861.091	676218.337
85d	7647926.996	676227.325
86a	7646399.184	675044.019
86b	7646980.352	674918.199
86c	7647522.576	674801.366
86d	7647609.451	674780.396
86e	7648223.572	674648.585
87a	7646164.654	673769.275
87b	7646649.190	673604.716
87c	7646758.896	673568.147
87d	7647362.280	673303.024
87e	7648495.911	673001.332
88a	7645680.118	672525.938
88b	7645972.668	672471.085
88c	7646402.351	672407.090

Table 2. Proposed geodetic coordinates for each sampling station (page 13 of 13).

Station	Oregon State Plane, North North American Datum 83/91 Easting	Northing
88d	7646850.318	672324.810
88e	7647060.588	672297.384
88f	7647682.257	672187.678
88g	7648331.352	672096.256
88h	7649172.432	671949.981
89a	7645140.730	671182.037
89b	7645844.678	671163.753
89c	7646118.943	671163.753
89d	7646813.749	671154.611
89e	7647307.427	671136.327
89f	7647974.806	670660.933
89g	7648431.916	671328.312
89h	7649949.518	671090.616
90a	7645168.156	669783.283
90b	7645424.137	669819.852
90c	7646411.493	669911.274
90d	7646795.465	669956.985
90e	7647563.408	670030.122
90f	7648212.503	670094.118
90g	7649538.120	670222.108
91a	7645542.986	668494.236
91b	7646301.787	668603.942
91c	7646786.323	669170.757
91d	7647097.157	668731.932
91e	7647609.119	669198.184
91f	7648697.039	668978.771
91g	7649126.721	669042.767
91h	7649391.845	669088.478
92a	7645918.032	667258.322
92b	7646021.635	667270.162
92c	7646936.309	667370.806
92d	7647532.124	667725.927
92e	7647583.000	667628.798
92f	7648091.769	667661.174
92g	7648327.653	667522.419
92h	7648665.290	667559.420
92i	7648776.294	667573.296



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TRIPLIN Environmental Associates

SITE MAP for
Lower Willamette Work Plans

This map is projected on LAMBERT GRID for OREGON NORTH ZONE NAD 83.
Base features were provided by: METRO REGIONAL SERVICES and COE., and Others.

N

Work Plans for the Lower Willamette River Sediment Profile Image Survey.
File: ph-spi-transects.apr
Plot date: 4-4-01

Figure 1

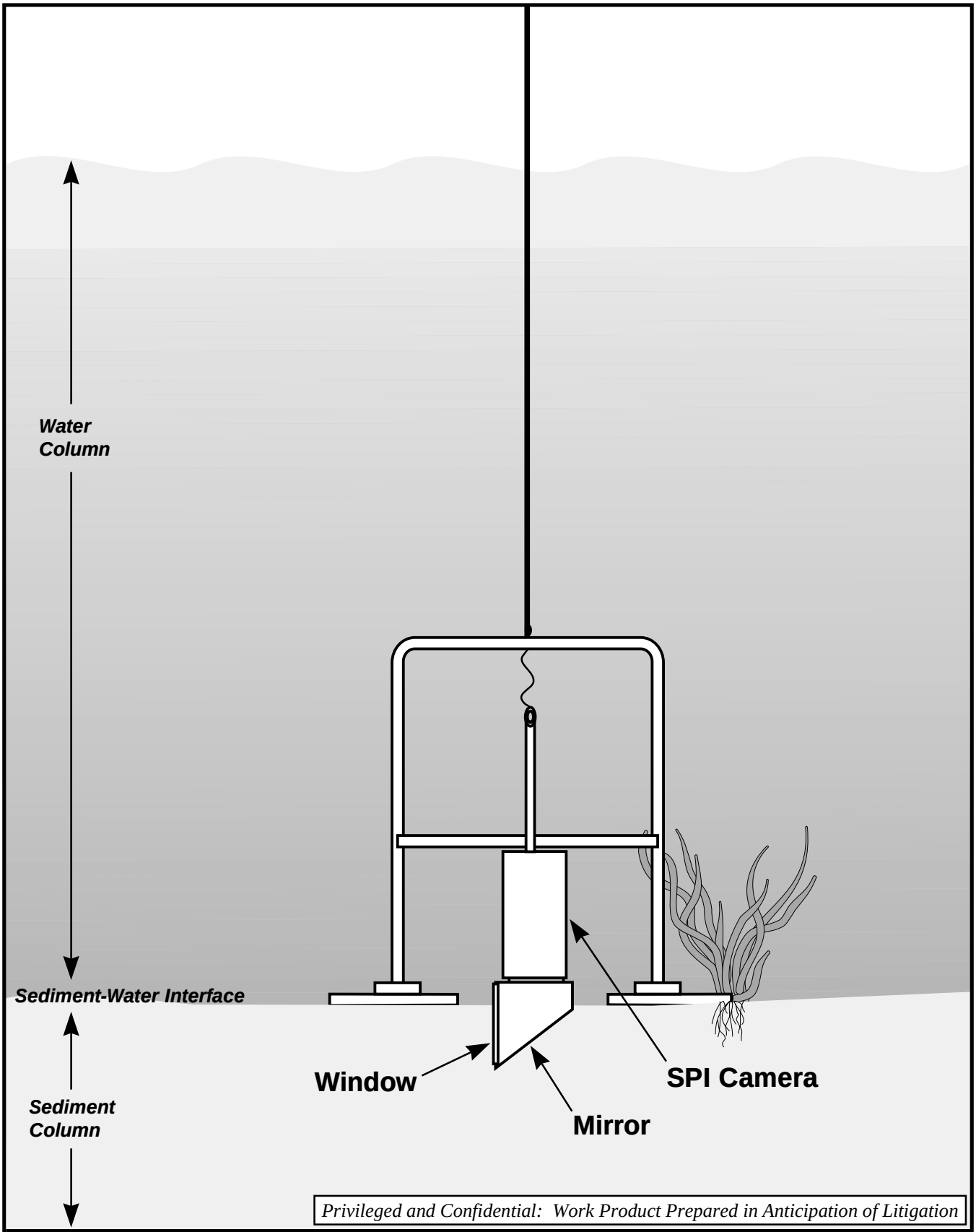

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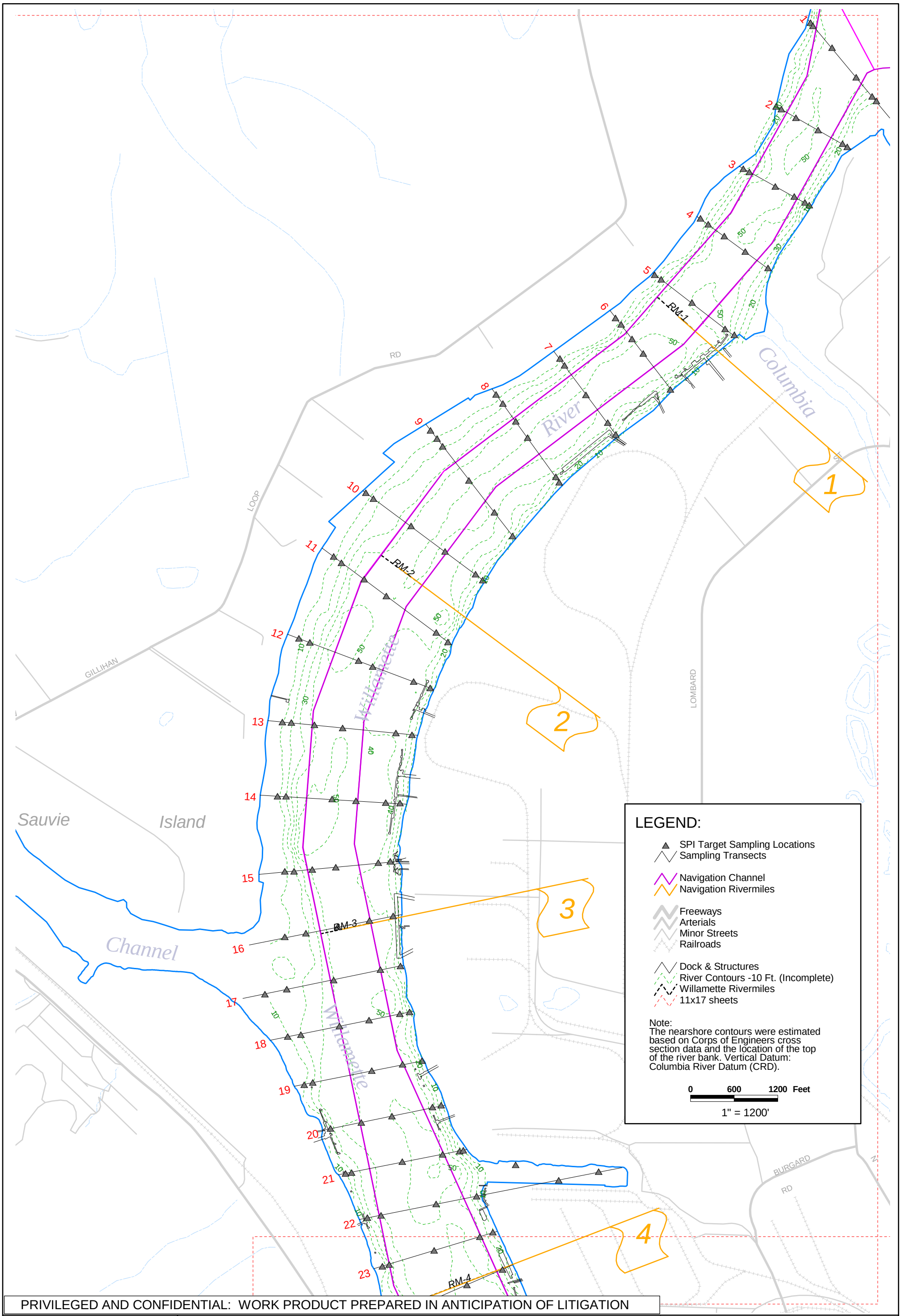
Figure 2

Sediment Profile Imaging Camera Schematic.

Sediment Profile Camera

April 2001

SPI_schematic.xar



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WORK MAP for Lower Willamette SPI Stations

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Work Plans for the Lower Willamette River Sediment Profile Image Survey.
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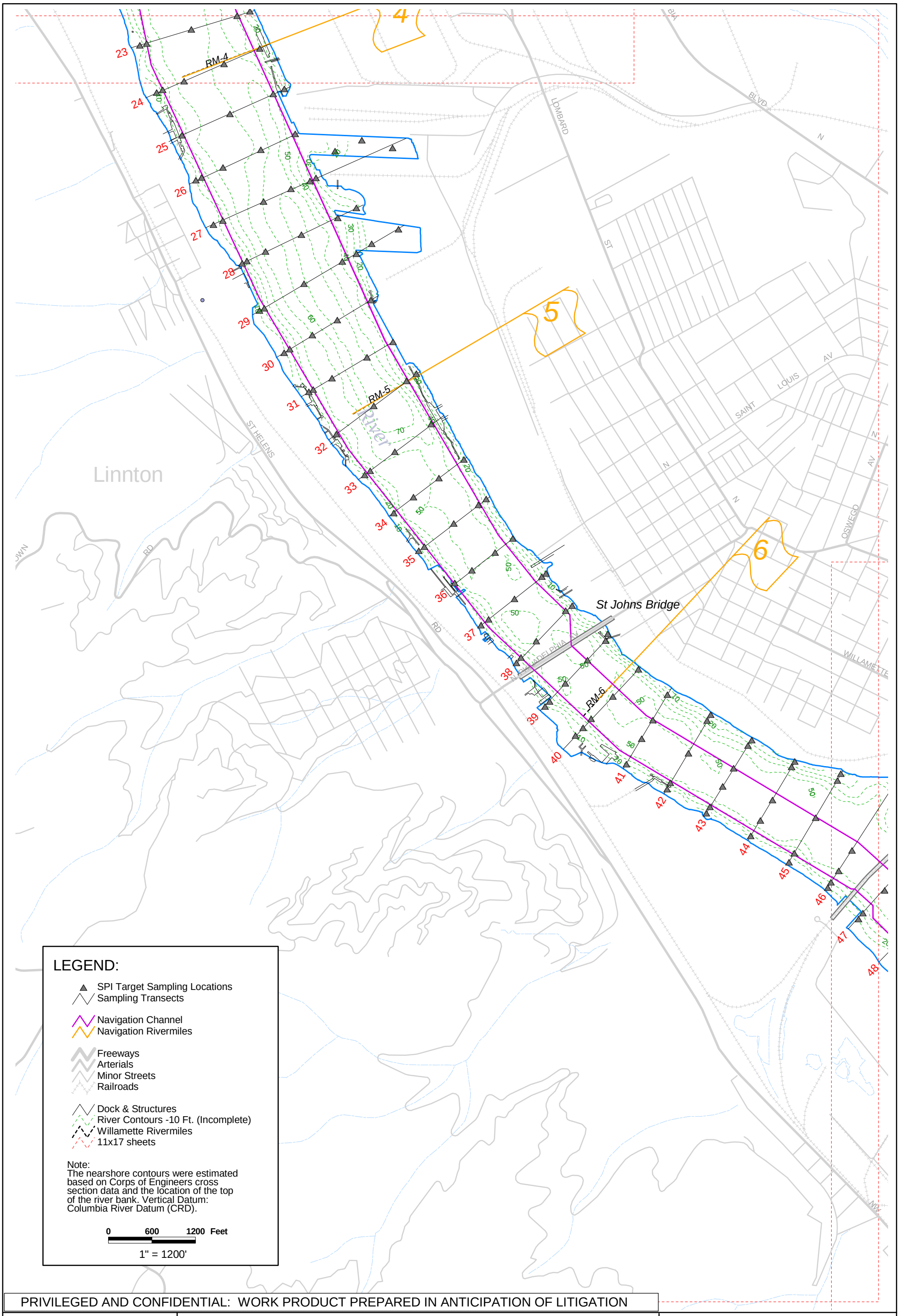
Plot date: 4-24-01

Figure 3a



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WORK MAP for Lower Willamette SPI Stations

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Work Plans for the Lower Willamette River Sediment Profile Image Survey.
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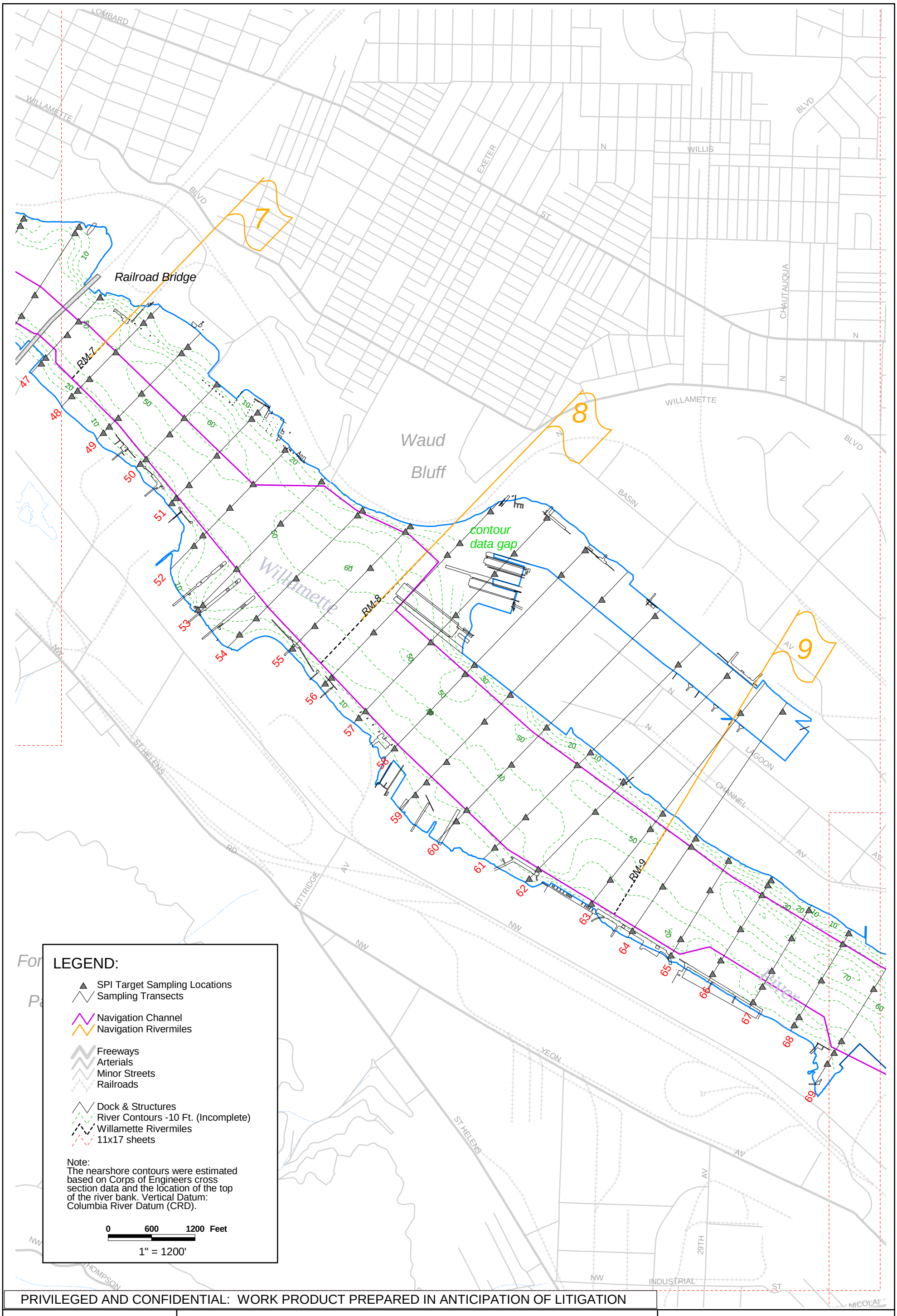
Plot date: 4-24-01

Figure 3b



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WORK MAP for Lower Willamette SPI Stations

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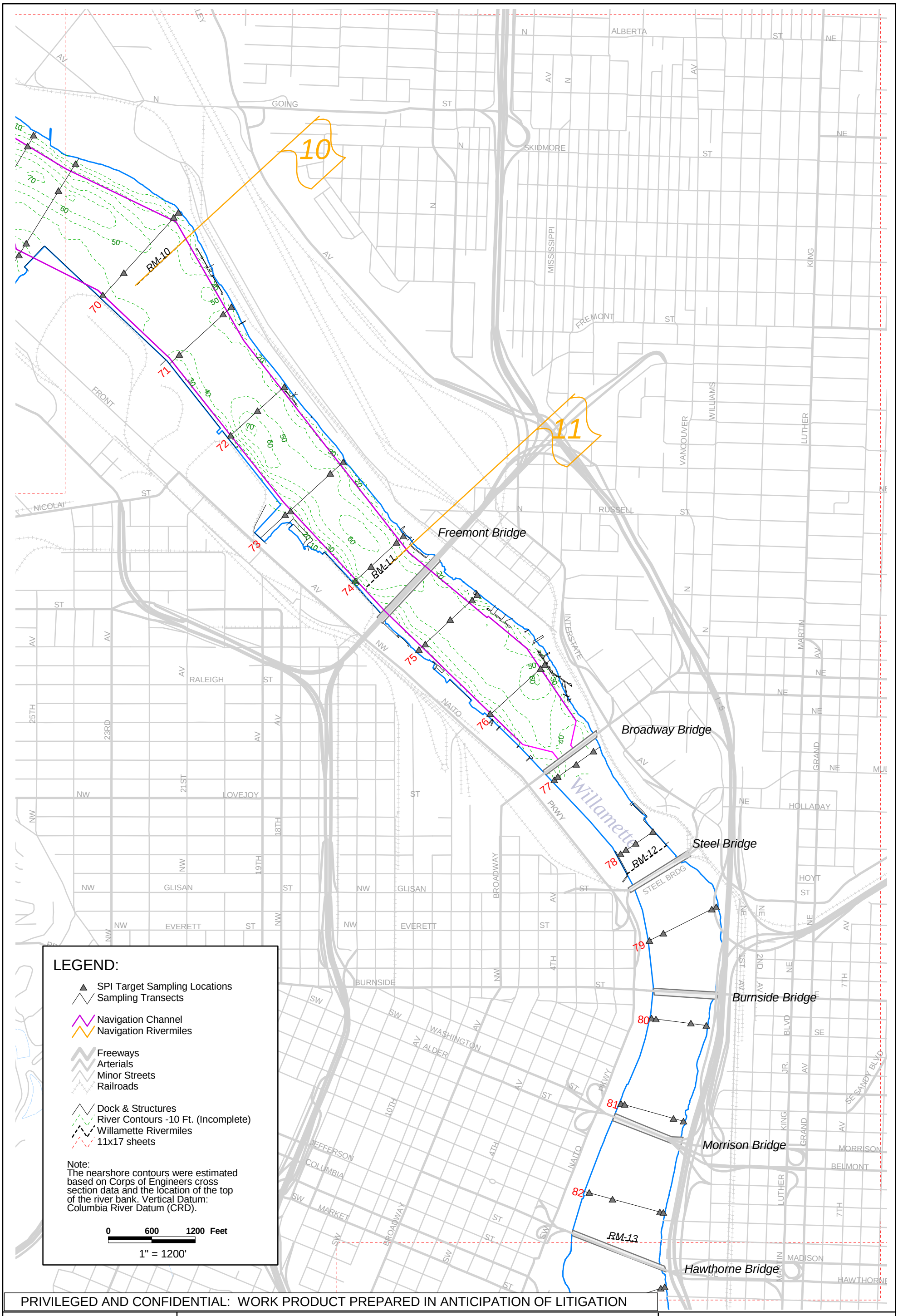
Work Plans for the Lower Willamette River Sediment Profile Image Survey.
File: ph-spi-transects.apr
Plot date: 4-24-01

Figure 3c



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WORK MAP for Lower Willamette SPI Stations

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Work Plans for the Lower Willamette River Sediment Profile Image Survey.
File: ph-spi-transects.apr
Plot date: 4-24-01

Figure 3d

Hawthorne Bridge

Marquam Bridge

Ross Island Btidge

RM-14

RM-15

RM-16

Ross Island

Hardtack Island

Willamette River

83
84
85
86
87
88
89
90
91
92
93

LEGEND:

- SPI Target Sampling Locations
- Sampling Transects
- Navigation Channel
- Navigation Rivermiles
- Freeways
- Arterials
- Minor Streets
- Railroads
- Dock & Structures
- River Contours -10 Ft. (Incomplete)
- Willamette Rivermiles
- 11x17 sheets

Note:
The nearshore contours were estimated based on Corps of Engineers cross section data and the location of the top of the river bank. Vertical Datum: Columbia River Datum (CRD).

0 600 1200 Feet

1" = 1200'

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WORK MAP for Lower Willamette SPI Stations

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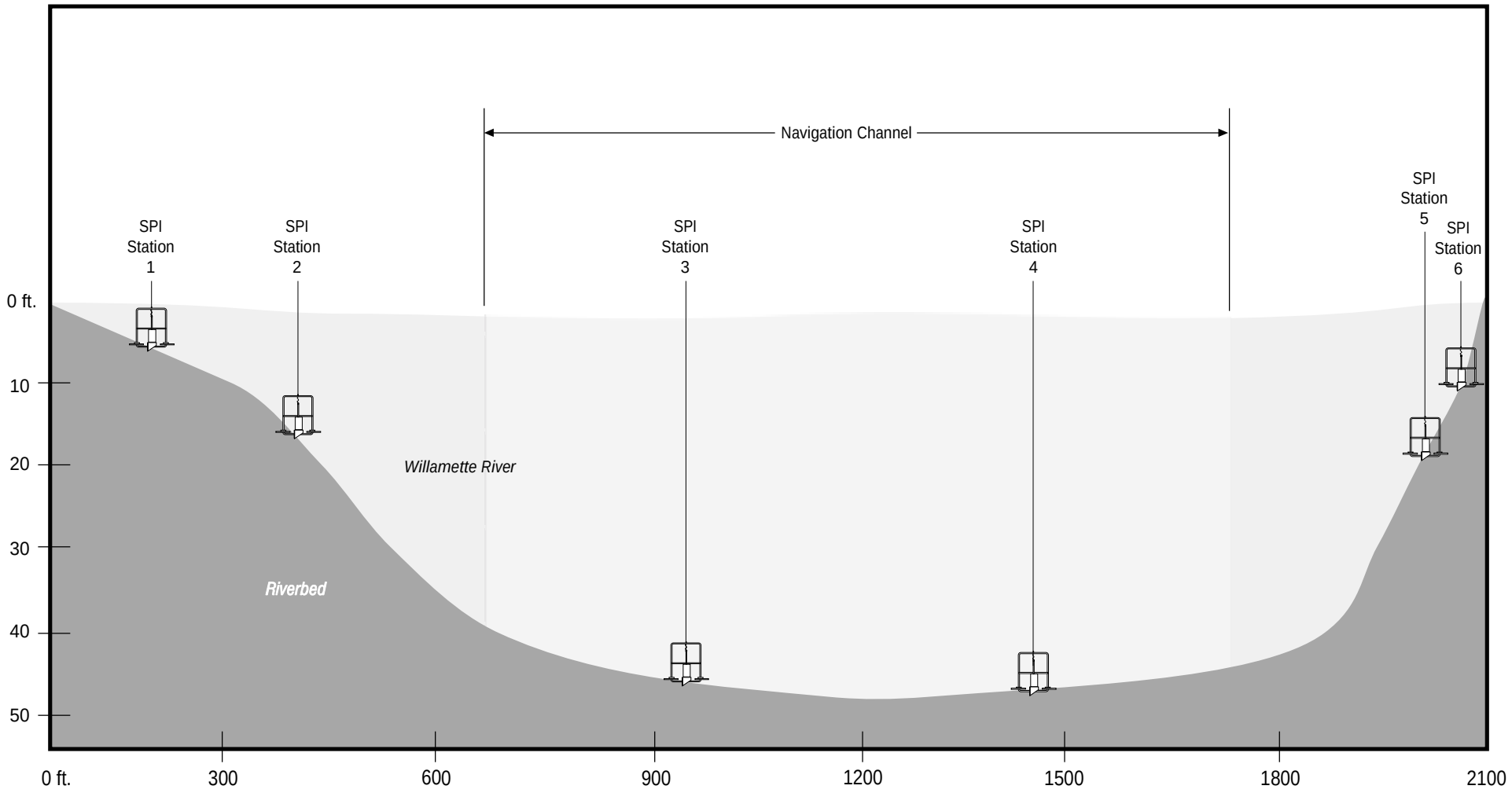
Work Plans for the Lower Willamette River Sediment Profile Image Survey.
File: ph-spi-transects.apr
Plot date: 4-24-01

Figure 3e



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TRIPLIN Environmental Associates	Figure 4 Schematic Cross-section of the Willamette River Showing Relative Locations of Target SPI Stations.	Lower Willamette SPI SAP April 2001 SPI LWillamette SAP_Xsection.xar

Survey ______________________ Date dd | mmm | yyyy Page ________

Field Crew: ______________________

	SPI Field Data Information				Image Quality Check			
Station	Time	Depth	Frame	Penetration	Rep	Interval	OK?	Comments
					A	5s		
						20s		
					B	5s		
						20s		
					C	5s		
						20s		
					A	5s		
						20s		
					B	5s		
						20s		
					C	5s		
						20s		
					A	5s		
						20s		
					B	5s		
						20s		
					C	5s		
						20s		
					A	5s		
						20s		
					B	5s		
						20s		
					C	5s		
						20s		
					A	5s		
						20s		
					B	5s		
						20s		
					C	5s		
						20s		
					A	5s		
						20s		
					B	5s		
						20s		
					C	5s		
						20s		

Striplin Environmental Associates

Figure 5

Example Sediment Profile Imaging field log data sheet.

APPENDIX A – HEALTH AND SAFETY PLAN

DRAFT REPORT

HEALTH AND SAFETY PLAN

LOWER WILLAMETTE RIVER
SEDIMENT PROFILE IMAGE SURVEY

PORTLAND, OREGON

24 April 2001

Prepared for:

The Lower Willamette Group

Prepared by:

Striplin Environmental Associates, Inc.
222 Kenyon Street NW
Olympia, WA 98502-4553

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ACRONYMS

LWG	Lower Willamette Group
RM	River Mile
SEA	Striplin Environmental Associates, Inc.
SPI	Sediment Profile Imaging

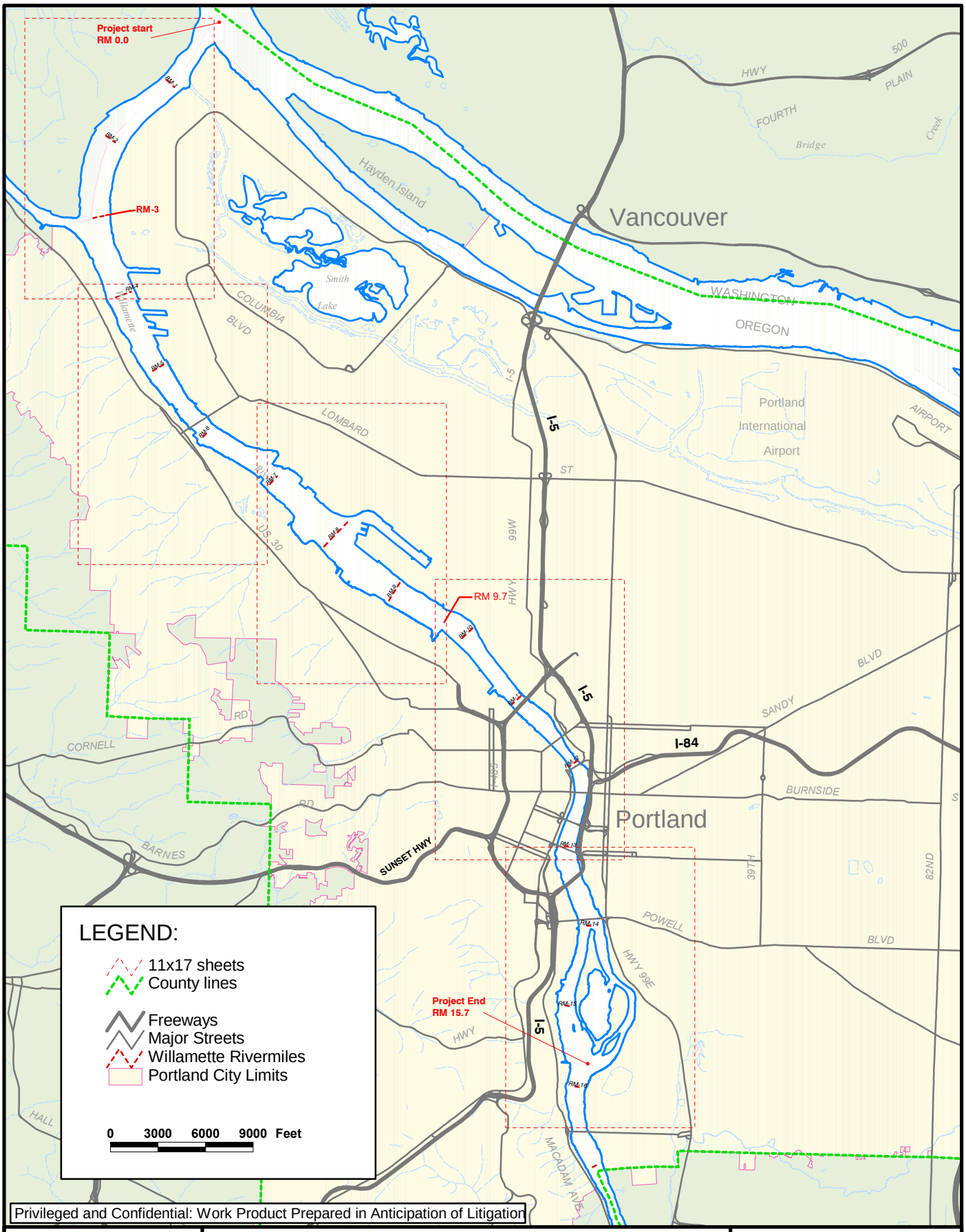
1.0 INTRODUCTION

The protective practices and information provided in this health and safety plan will be followed by personnel employed or contracted by Striplin Environmental Associates, Inc. (SEA) of Olympia, Washington during sediment profile imaging (SPI) activities in the Willamette River (Portland, Oregon). SEA is under contract with the Lower Willamette Group (LWG) to collect SPI data in the Willamette River from River Mile (RM) 0 to RM 15.7. SEA's responsibilities include project planning, image acquisition and analysis, and reporting.

All individuals performing fieldwork must read, understand, and comply with this plan. Visitors must also read and comply with the plan. The plan must be read before a participant undertakes field activities; if any part of the plan is unclear, clarification should be sought from one of the safety officers prior to commencing fieldwork. Once the information has been read and understood, the individual must sign an Acknowledgment Form (Form 1, Appendix A), which is then placed in the project file. Any modifications to the health and safety plan will be entered in Form 2 (Appendix A) which must be acknowledged by all sampling and processing personnel. The following subjects are addressed by the plan: existing site conditions, description of sampling and processing activities, hazard evaluation, hazard monitoring and control, emergency procedures, and worker training requirements.

2.0 EXISTING SITE CONDITIONS

SPI images will be obtained throughout the Lower Willamette River (i.e., bank-to-bank) from RM 0 to RM 15.7 (i.e., from its convergence with the Columbia River up to the upstream end of Ross Island). Approximately 500 stations will be sampled across this area, and, in general, stations will located along regularly-spaced, cross-river transects (Figure 1). The goal of the SPI survey is to characterize gradients in benthic conditions throughout the Lower Willamette. Because the relatively deep (40+ ft) federally maintained navigation channel represents a fairly uniform benthic environment, approximately two-thirds of the SPI stations to be sampled are located in the more heterogeneous, nearshore areas that are less than 20 ft deep.



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TRIPLIN Environmental Associates

SITE MAP for
Lower Willamette Work Plans

This map is projected on LAMBERT GRID for OREGON NORTH ZONE NAD 83.
Base features were provided by: METRO REGIONAL SERVICES and COE., and Others.

N

Work Plans for the Lower Willamette River Sediment Profile Image Survey.
File: ph-spi-transects.apr
Plot date: 4-4-01

Figure 1

3.0 DESCRIPTION OF SAMPLING ACTIVITIES

Sediment profile images will be collected to document the physical and biological characteristics of the benthic environment in the lower Willamette River. Images will be collected using a Benthos Model 3731-A Sediment Profile Camera (Benthos, Inc., North Falmouth, MA) operated from the research vessel R/V NANCY ANNE (Marine Sampling Systems, Burly, WA). To acquire data at the designated SPI stations, the vessel will be piloted to the station and the camera deployed outboard. The SPI camera will be lowered and suspended above the sediment until the vessel is within 50 feet of the target station. Once within this 50 feet radius, the camera will be lowered to the seafloor and the images acquired. At the end of each survey day, film from the SPI camera will be developed to ensure adequate image acquisition. The combined sampling and analysis plan / quality assurance project plan (SEA 2001) contains detailed sampling methods.

4.0 HAZARD EVALUATION

The overall hazard level associated with the lower Willamette River SPI activities is low. Hazards encountered during SPI projects are due to physical safety hazards associated with field operations and potential exposure to chemicals used in film development and found in site sediments. As described below, protective equipment and safe working procedures will help prevent accidents caused by these hazards. The field crew may come into contact with site sediments even though any sediment that sticks to the SPI equipment will be rinsed off before the equipment is brought back aboard the sampling vessel. Exposure to harmful microbial organisms or other organisms in the sediments is not expected during this project; therefore, biological hazards are not discussed.

4.1 CHEMICAL HAZARDS

4.1.1 Potential Chemical Hazards in Sediments

Sediments examined as part of this SPI survey are not expected to contain chemicals at concentrations that require extraordinary precautions. However, additional protective measures can be instituted if evidence of extreme contamination (i.e., odor, petroleum products, excessive organic enrichment) is detected in the sediment.

Chemicals previously identified in the Lower Willamette River include 2,4-dichlorophenoxyacetic acid, tributyltin, polychlorinated biphenyls, dichlorodiphenyltrichloroethane, polynuclear aromatic hydrocarbons, arsenic, cadmium, chromium, copper, lead, mercury, and zinc (Roy F. Weston, Inc. 1998). These chemicals are relatively nonvolatile and pose a low risk for inhalation. Chemicals will be bound in a wet solid matrix (i.e., the sediment), and personnel will be working in the open. Nonetheless, these compounds are potentially hazardous and exposure by all routes should be minimized. Material safety data sheets for these compounds are provided in Appendix B.

Respiratory and inhalation hazards are expected to occur only under dusty (dry) and windy conditions – conditions not likely to be found while handling SPI equipment as part of the Lower Willamette River SPI survey.

Sediments containing chemicals can cause irritation and burning when in contact with the skin and eyes. As a precautionary measure, nitrile gloves will be worn at all times when surveying and handling the SPI equipment after it has come in contact with site sediments. To avoid accidental ingestion of chemicals present in the sediment or while decontaminating sampling gear, gloves in contact with potential hazardous chemicals should not then come in contact with the facial area.

4.1.2 Potential Chemical Hazards in Film Processing

The chemicals used in the film developing process are less dangerous than many common household cleaners, but precautions should be taken. This is the safety advice as given in the Tetenal Photowerk GMBH & Co. instruction manual:

First Developer (1-10% potassium hydroquinone monosulfonate): May cause allergic skin reaction. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated shoes. If swallowed, give 1 or 2 glasses of water and get immediate medical attention.

Color Developer Part 1 (0.5-2% sodium hydroxide): Causes skin and eye irritation. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes and flush skin with plenty of water. Remove contaminated clothing and shoes. Call a physician immediately.

Color Developer Part 2 (5-10% p-phenylene diamine derivate): May cause allergic skin reaction. Avoid prolonged or repeated contact with skin. Wash thoroughly after handling. In case of contact, immediately flush skin with soap and plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Destroy contaminated shoes.

Bleachfix Part 1: Avoid contact with eyes and skin. Wash thoroughly after handling. In case of contact, immediately flush eyes and skin with plenty of water.

Bleachfix Part 2: Avoid contact with eyes and skin. Wash thoroughly after handling. In case of contact, immediately flush eyes and skin with plenty of water.

Stabilizer (1-5% formaldehyde): Possible cancer hazard. May cause cancer based on animal data. Harmful if inhaled. Causes skin and eye irritation. May cause allergic respiratory reaction and allergic skin reaction. Do not breathe gas. Keep container closed. Use only with adequate ventilation. Avoid prolonged or repeated contact with skin, eyes, and clothing. Wash thoroughly after handling. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush skin with soap and skin/eyes with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention.

4.2 PHYSICAL HAZARDS

4.2.1 Research Vessel Operations

The physical hazards associated with the deployment and retrieval of large pieces of sampling equipment result from their weight and the method of deployment. Only personnel whose presence is required will deploy and retrieve the camera. Under circumstances of potentially dangerous waves or winds, the vessel pilot and cruise leader will employ best professional judgment to ensure safe field operations. An emergency procedure for a man-overboard is discussed in Section 6.4.

To avoid injuries from deck gear and equipment, all personnel on the deck work area will wear hard hats, steel-toed boots, and Coast Guard-approved type II personal floatation devices. Sample handling equipment, containers, deck lines, and water hoses not in immediate use will be kept clear of walkways and work areas until needed.

4.2.2 Physical Exposure

Exposure to the elements and fatigue are two major causes of accidents on boats. The sampling event may include long workdays, and in the Pacific Northwest the weather can be unpredictable. Working in cold, rough waters can lead to seasickness, fatigue, and exposure. The combination of rough waters and fatigue increases the chances for a man-overboard situation. To prevent fatigue and overexposure in adverse weather conditions, field personnel will take regular work breaks. Extra clothing will be brought to accommodate changes in weather. Cold stress can be manifested as both hypothermia and frostbite (discussed further in Section 6.5). Heat-related illnesses can occur at any time when protective clothing is worn. When temperatures average 70-75^{o}F, the risk of heat-related illnesses increases. Heat stress can be manifested as both heat stroke and heat exhaustion (discussed further in Section 6.6). Life vests are available for all personnel working on the deck. The vessel is also equipped with throwable life rings, and each crew member will be briefed on their storage location. Fatigue also presents a hazard when working on the water. It can be compounded by the motion of the vessel, exposure, or heat stress. Personnel should monitor their own condition and capabilities and should be responsible for taking appropriate measures (discussed below) to relieve fatigue, exposure, or heat stress. The chief scientist/safety officer and vessel operator can also direct any member of the crew to cease working.

5.0 HAZARD MONITORING AND CONTROL

5.1 PERSONNEL AND ORGANIZATION

Project organization and health and safety responsibilities for SEA employees for this sampling program will be as follows.

Cruise Leader/Site Safety Officer. Tom Schulz, SEA, will be in charge of all sampling activities on board the vessel. The cruise leader will also serve as site safety officer and is responsible for health and safety procedures on the vessel, including:

- Ensuring that all SEA workers know and follow the project health and safety plan
- Conducting health and safety meetings or briefings, as necessary
- Evaluating and modifying the level of protective apparel and equipment, as necessary, based on site conditions
- Verifying compliance with the health and safety plan and applicable health and safety regulations

Field Staff. All SEA employees and contractors will be responsible for knowing and implementing the policies and procedures stated in the project health and safety plan, including:

- Complying with proper safety and health practices, as stated in the plan and training
- Using required safety devices and personal protective equipment
- Notifying a supervisor of unsafe conditions or acts immediately
- Reporting all accidents to a supervisor promptly, regardless of the severity of injury
- Carrying out all work in a manner not endangering to any employee

5.2 PERSONAL PROTECTIVE CLOTHING AND EQUIPMENT

On board the sampling vessel, protective gear includes regular work clothes with coated rain pants. Also included are the following:

- Nitrile outer gloves
- Steel-toed, chemically resistant, impermeable outer boots
- Hard hat

Each crew member is expected to bring clothing appropriate to the weather and work task to minimize the hazards of exposure and heat stress. Flotation vests are provided and will be worn by SEA personnel.

While developing film, chemically resistant “examination” gloves and safety glasses will be worn. The gloves will be nitrile examination gloves because latex provides nearly no chemical resistance, can cause allergic reactions in some people, and in some cases can actually absorb and hold chemicals close to the skin.

5.3 SITE CONTROL MEASURES

There are no designated exclusion zones on the sampling vessel because any site sediment that sticks to the SPI equipment will be washed off prior to bringing the equipment back on board the sampling vessel. However, the fore deck of the NANCY ANNE is designated as the work zone. Personnel are expected to use direct line-of-sight and open communications while in the work zone.

5.3.1 Other Safety Procedures

All personnel working in the field will follow the rules and procedures listed below:

- Before any field sampling begins, all personnel must review the project health and safety plan, become familiar with the required safety procedures, and sign the plan acknowledgment form.
- Copies of the health and safety plan will be available on board the vessel.
- The vessel operator and cruise leader will monitor weather conditions and forecasts. Either the vessel operator or the cruise leader has the authority to halt operations if conditions are deemed to be unsafe.
- The buddy system will be used during all sampling activities.
- All personnel are responsible for monitoring their own condition relative to heat, cold, and fatigue. Personnel will inform the safety officer of discomfort or fatigue immediately.

5.4 POST-SAMPLING DECONTAMINATION

All sampling equipment and impermeable personal protective gear will be decontaminated as follows:

- Rinse with tap water or water provided by the sampling vessel
- Scrub with brush and Alconox detergent
- Rinse with tap water or water provided by the sampling vessel

Impermeable protective gear will be decontaminated before removal. Outer gloves will be removed first followed by raingear and boots. Hands should then be thoroughly washed.

5.5 MANAGEMENT PLAN FOR INVESTIGATION-DERIVED WASTE

All used or excess photo chemicals will be collected, diluted by at least 1:1 with tap water, and disposed to the local municipal wastewater treatment facility.

5.6 VISITORS

Only authorized visitors will be allowed to observe SPI operations. Visitors will be restricted to areas where no large equipment is handled and must obey all instructions of the cruise leader. Exceptions to this are representatives from government agencies or other members of the project consultant team who establish that they possess training consistent with the requirements of this

plan. They must also possess appropriate health and safety equipment at the time of the visit, have a health and safety plan at least as stringent as this plan, or adopt and sign this plan as their own.

6.0 EMERGENCY PLAN

6.1 PRE-SURVEY EMERGENCY RESPONSE COORDINATION

Immediately following confirmation of the sampling schedule, the Multnomah County Sheriff River Patrol should be notified so they will be aware of the sampling activities. They can be contacted by phone at 503-288-6788. The U.S. Coast Guard Navigation Center for District 13 should also be notified so they can post a notice about the sampling activities in the Local Notice to Mariners. This will make barge and other river traffic aware of the sampling activities. The District 13 Navigation Center can be contacted by email (cmellinger@pacnorwest.uscg.mil) or by phone (206-220-7270).

6.2 REPORTING/NOTIFICATION PROCEDURES

In the case of any emergency, the SEA Site Safety Officer is to be notified immediately. The Site Safety Officer will initiate contacts as follows:

1) Call appropriate emergency services numbers (ambulance, fire, etc.) if not already done. Provide the following information:

   - Name and location of person reporting
   - Location of accident/incident
   - Name and affiliation of injured party
   - Description of injuries
   - Status of medical aid effort
   - Details on any chemicals involved and description of any personnel or contaminated gear to be sent with the injured party
   - Summary of the accident, including the suspected cause and the time of occurrence
   - Temporary control measures taken to minimize further risk

   Note: This information is not to be released under any circumstances to parties other than the Site Safety Officers and bona fide emergency response team members.

2) Call Project Safety Officer and provide information noted in Step 1 above.

3) The Site Safety Officer or other delegated person will complete a written accident/incident report using Form 3 (Appendix A) within 24 hours, sending copies to the LWG representative and SEA Company Safety Officer.

The following resources are to be used in cases of emergency:

- **Emergency Contacts:** Table 1 includes both the appropriate emergency services (top of table) and the appropriate project contacts (bottom of table).
- **Nearest Phone:** A cellular telephone will be on the vessel.

- **Onsite Emergency Equipment:** An industrial first aid kit, portable fire extinguisher, and an eyewash kit will be located on the vessel.
- **Offsite Emergency Services:** Phone numbers for offsite emergency services are listed in Table 1. Copies of this table must be located on the vessel.

Table 1. Emergency Services and Contacts.

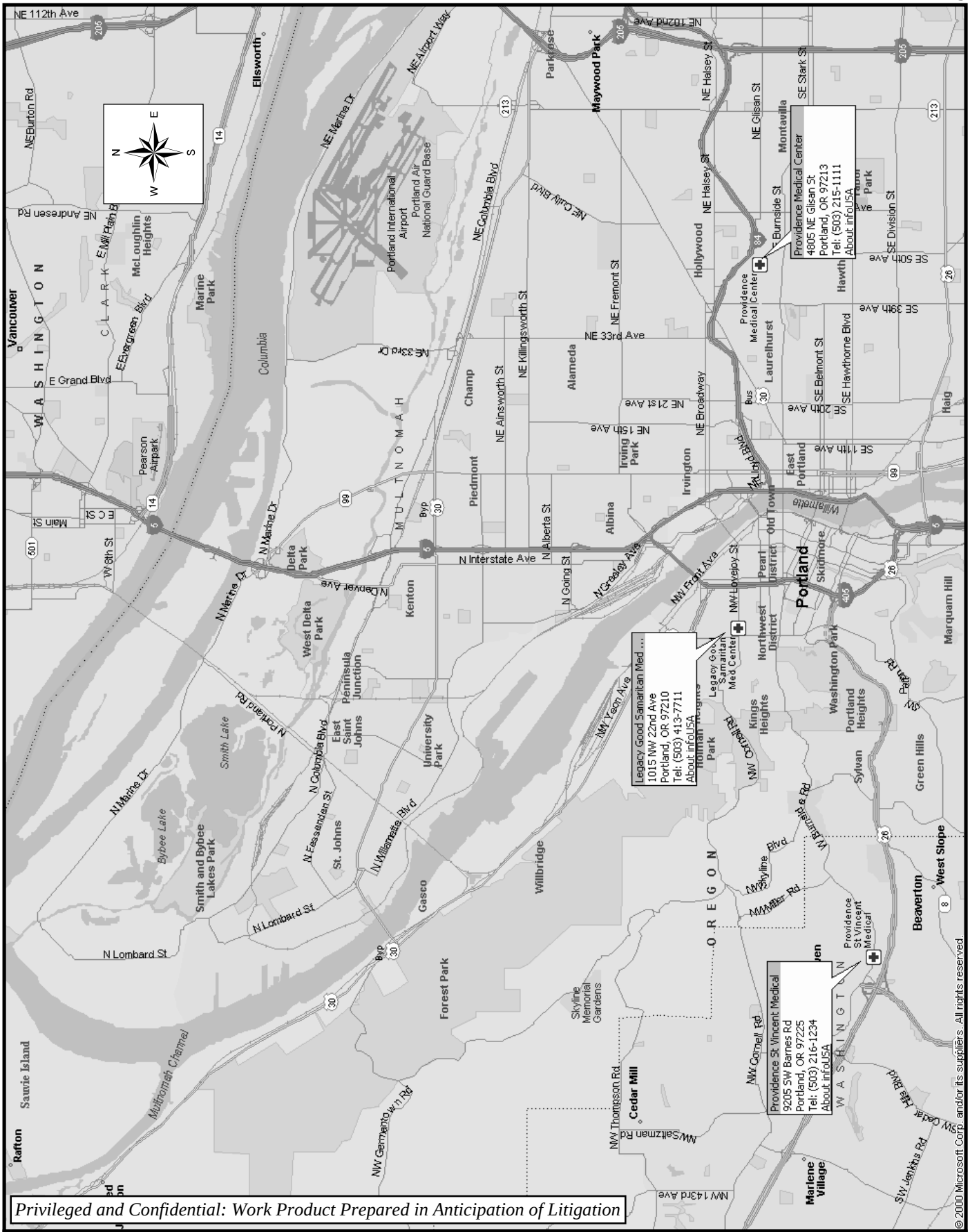
Emergency Services

Service	Name/Location	Phone Number
Ambulance	---/---	911
Fire	---/---	911
Police	Emergency	911
	Multnomah County Sheriff River Patrol	503-288-6788
Hospitals	Providence Portland Medical Center 4805 NE Glisan Street Portland, OR 97213	503-215-1111 operator 503-215-6000 emergency
	Providence St. Vincent Medical Center 9205 SW Barnes Road Portland, OR 97225	503-216-1234 operator 503-216-2361 emergency
	Legacy Good Samaritan Hospital 1015 NW 22nd Avenue Portland, OR 97210	503-413-7711 operator

Contact Information*

Project Safety Officer		
Vicki Fagerness	(360) 705-3534 (office)	SEA, Olympia, WA
Site Safety Officer		
Tom Schulz	(360) 705-3534 (office) (206) 419-0809 (cellular)	SEA, Olympia, WA

* Numbers listed are office telephones; home numbers will also be provided on the vessel.



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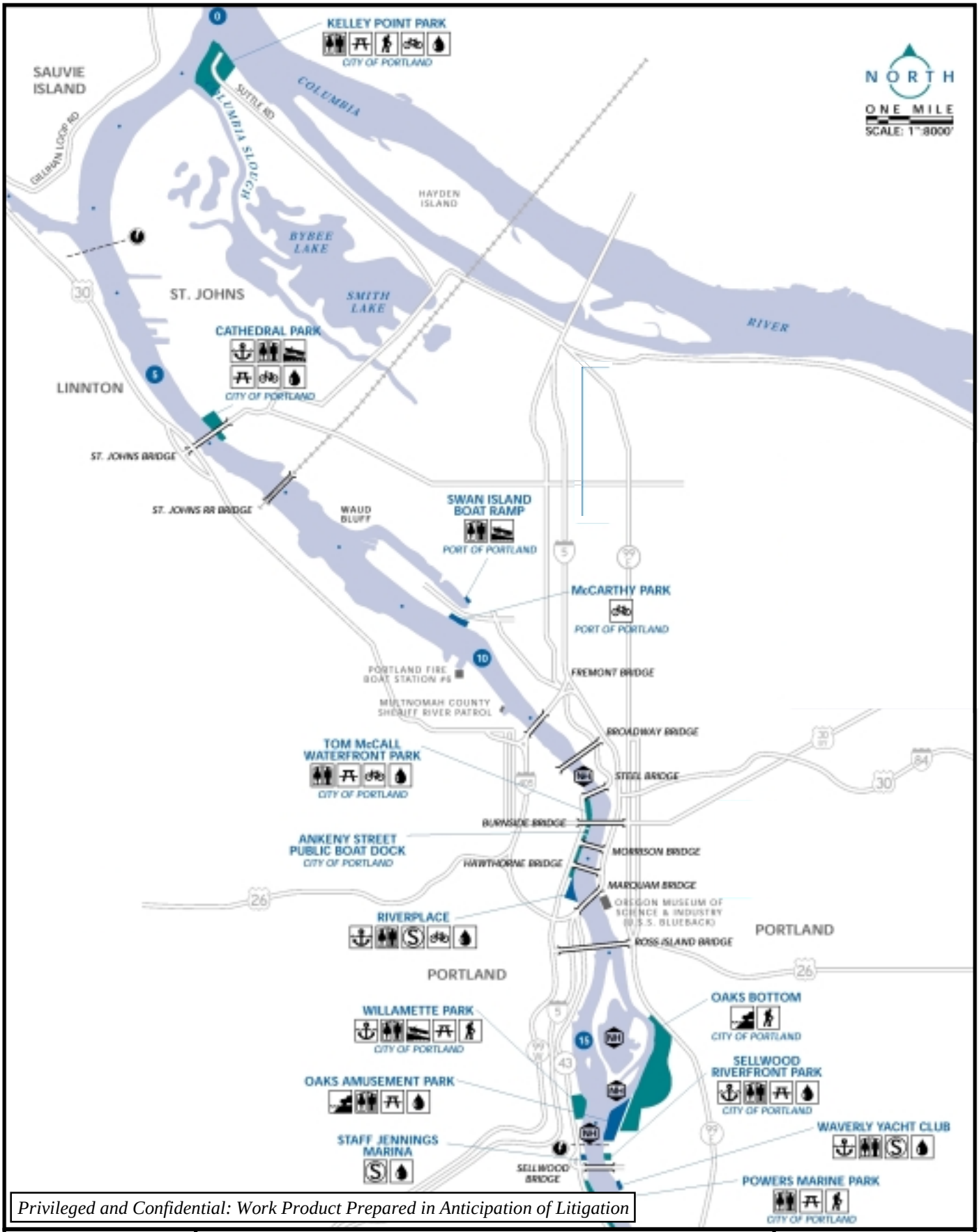
STRIPLIN Environmental Associates	Figure 2 Area street map indicating local hospitals.	Lower Willamette H&S April 2001 SPI LWillamette H&S_figure2.xar



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TRIPLIN Environmental Associates

Figure 3

Public access ramps/docks to the Lower Willamette River.

From the Willamette River Recreation Guide, a publication of Oregon State Marine Board and Oregon State Parks (September, 1998)

Lower Willamette H&S

April 2001

SPI LWillamette H&S_docks.xar

6.3 HOSPITAL ROUTES

If an injury requiring immediate medical assistance occurs on the vessel, the injured person should be transported to the hospital by ambulance. If medical care is required, but ambulance service is not warranted, field vehicles may be used to transport the injured person to the hospital (Figure 2).

If ambulance service is required:
If the accident occurs on the water, the sampling vessel should proceed directly to the nearest accessible location (Figure 3). Emergency services should be immediately contacted using the cell phone to arrange pickup at the dock.

6.4 MAN OVERBOARD

While the team is working over water on the research vessel and using heavy equipment (e.g., the SPI camera), or during stormy weather, there is a potential for a man-overboard situation. If this situation occurs, all vessel engines will be stopped immediately. Flotation devices (e.g., life rings) attached to lines will be thrown to the victim from the vessel. The victim will then be brought aboard the research vessel or towed to shore; wet clothes will be removed and replaced with dry clothing. The victim may need to be treated for cold stress (discussed below). No other person shall enter the water except if the victim is unconscious or seriously injured. Rescuers must wear life preservers and be tethered to the research vessel or shore.

6.5 COLD STRESS

In cold weather conditions, field teams must be prepared to wear proper protective clothing and to recognize symptoms of cold stress. Cold stress can be manifested as both hypothermia and frostbite.

Hypothermia, a cold-induced decrease in the core body temperature, can decrease attentiveness and manual dexterity. Hypothermia produces shivering, numbness, drowsiness, muscular weakness, and, if severe enough, death.

Treatment: A victim of hypothermia should be taken indoors (or into the vessel's cabin) quickly. Provide rapid but gentle warming. Remove wet or cold garments and provide warm, dry clothing or covering. Dry the person thoroughly. If the victim reacts and is conscious, give a hot drink. It may be necessary to wrap the victim together with warm water bottles, or persons in blankets, or a sleeping bag. Call for medical care at once.

Frostbite results from the constriction of blood vessels in the extremities and decreases the supply of warming blood to these areas. This drop in blood supply may result in the formation of ice crystals in the tissues, causing tissue damage. The symptoms of frostbite are white or grayish skin, blisters, or numbness.

Treatment: Bring the victim indoors and warm the areas quickly in water of 102^{o}F to 105^{o}F. Give a warm drink - not hot coffee, tea, or alcohol. The victim should not smoke. Smoking

tends to constrict the blood vessels in the skin, making the injury slow to heal. Keep the frozen parts in warm water or covered with warm cloths for 30 minutes. Then elevate the injured area and protect it from injury. Do not allow the blisters to be broken. Use sterile, soft, dry material to cover the injured areas. Keep the victim warm and get immediate medical care.

6.6 HEAT STRESS

Heat-related illnesses can occur at any time when protective clothing is worn. If site activities take place when temperatures average 70-75^{o}F, the risk of heat-related illnesses increases. Heat stress can be manifested as both heat stroke and heat exhaustion:

Heat stroke occurs when a person's temperature control system that causes sweating stops working correctly. The body temperature rises so high that brain damage and death will result if the person is not cooled quickly. The main signs of heat stroke are red or flushed, hot, dry skin, although the person may have been sweating earlier; and extremely high body temperature, often to 106^{o}F (41^{o}C). There may be dizziness, nausea, headache, rapid pulse, and unconsciousness.

Treatment: Cool a victim of heat stroke quickly. If the body temperature is not brought down fast, permanent brain damage or death will result. Soak the person in cool but not cold water, sponge the body with rubbing alcohol or cool water, or pour water on the body to reduce temperature to a safe level - about 102^{o}F (39^{o}C). Then stop cooling and observe the victim for 10 minutes. If the temperature starts to rise again, cool the victim again. Do not give coffee, tea, or alcoholic beverages. When the victim's temperature remains at a safe level, put the victim to bed and get medical help.

Heat exhaustion is much less dangerous than heat stroke. The major signs of heat exhaustion are pale, clammy skin, profuse perspiration, and extreme tiredness or weakness. The body temperature is approximately normal. The person may have a headache and may vomit.

Treatment: For mild heat exhaustion, provide bed rest. Give a salt solution (1/2 teaspoon salt in 1/2 glass of water) every 15 minutes for three or four doses. Medical care is needed for severe heat exhaustion.

7.0 TRAINING AND MEDICAL SURVEILLANCE

All personnel directly involved in this program have completed the 40 hour hazardous waste site training and, if applicable, the annual 8 hour refresher. No medical monitoring is required for SPI activities on the lower Willamette River.

8.0 PLAN ACCEPTANCE

This site health and safety plan has been written for the use of SEA personnel and its subcontractors. SEA claims no responsibility for its use by others. The plan is written for the specific site conditions, purposes, dates, and personnel specified and must be amended if these conditions change.

PLAN PREPARED BY: Striplin Environmental Associates, Inc.
DATE: 24 April 2001

ACCEPTED BY:

Name and Affiliation Date

9.0 REFERENCES

Roy F. Weston, Inc. 1998. Portland Harbor Sediment Investigation Report, Multnomah County, Oregon. Prepared for U.S. Environmental Protection Agency, Region 10. Roy F. Weston, Inc., Seattle, WA.

Striplin Environmental Associates, Inc. (SEA). 2001. Combined Sampling and Analysis Plan / Quality Assurance Project Plan for the Lower Willamette River Sediment Profile Image Survey. Prepared for Lower Willamette Group, Portland, Oregon. SEA, Olympia, WA.

Appendix A – Forms

FORM 1

ACKNOWLEDGMENT

I have read the attached Health and Safety Plan for the Lower Willamette River Sediment Profile Image Survey. I have discussed any questions that I have regarding these materials with the appropriate Site Safety Officer, and I understand the requirements of the Health and Safety Plan.

Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date
Signature	Date

FORM 2

MODIFICATION TO HEALTH AND SAFETY PLAN

DATE ___/___/

Modification:_____

_____

_____

Reasons for Modification:

Site Personnel Briefed:

NAME	DATE

Approvals:

Site Safety Officer:_____

Project Safety Officer:_____

Project Manager:_____

Others:_____

FORM 3
EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT
(Use additional page if necessary)

Date: _____ Time: _____

Name: _____ Employer: _____

Site Name and Location: _____

Site Weather (clear, rain, snow, etc.): _____

Nature of Illness/Injury: _____

Symptoms: _____

Action Taken: Rest: _____ First Aid: _____ Medical: _____

Transported by: _____ Witnessed by: _____

Hospital's Name: _____

Treatment: _____

Comments: _____

What was the person doing at the time of the accident/incident? _____

_____

Personal Protective Equipment Worn: _____

_____

Cause of Accident/Incident: _____

_____

What immediate action was taken to prevent recurrence? _____

_____

Additional comments: _____

_____

_____

Employee's Signature Date

_____

Supervisor's Signature Date

_____

Site Safety Representative's Signature Date

Appendix B – Material Safety Data Sheets

MATERIAL SAFETY DATA SHEET

2,4-Dichlorophenoxyacetic acid, 99+% (tlc)

96919

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: 2,4-Dichlorophenoxyacetic acid, 99+% (tlc)

2,4-D

Company Identification: Acros Organics N.V.
One Reagent Lane
Fairlawn, NJ 07410
For information in North America, call: 800-ACROS-01
For emergencies in the US, call CHEMTREC: 800-424-9300

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	EINECS#
94-75-7	2,4-Dichlorophenoxyacetic acid, 96%		202-361-1

Hazard Symbols: XN
Risk Phrases: 22 36/37/38

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: slightly beige.
Cancer suspect agent.
Target Organs: None.

Potential Health Effects

The toxicological properties of this material have not been investigated. Use appropriate procedures to prevent opportunities for direct contact with the skin or eyes and to prevent inhalation.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes:

Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower lids.

Skin:

Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes.

Ingestion:

Do NOT induce vomiting. Allow the victim to rinse his mouth and then to drink 2-4 cupfuls of water, and seek medical advice.

Inhalation:

Remove from exposure to fresh air immediately.

Notes to Physician:

Treat symptomatically and supportively.

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear.

Extinguishing Media:

In case of fire, use water, dry chemical, chemical foam, or alcohol-resistant foam.

Autoignition Temperature: Not available.
Flash Point: Not available.
NFPA Rating: Not published.

Explosion Limits, Lower: Not available.
Upper: Not available.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****
General Information: Use proper personal protective equipment as indicated in Section 8.
Spills/Leaks:
Sweep up, then place into a suitable container for disposal.

**** SECTION 7 - HANDLING and STORAGE ****
Handling:
Not available.
Storage:
Not available.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****
Engineering Controls:
Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.
Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
2,4-Dichlorophenoxy acetic acid, 96%	10 mg/m3	10 mg/m3 TWA 100 mg/m3 IDLH	10 mg/m3 TWA

OSHA Vacated PELs:
2,4-Dichlorophenoxyacetic acid, 96%: 10 mg/m3 TWA
Personal Protective Equipment
Eyes:
Wear safety glasses and chemical goggles if splashing is possible.
Skin:
Wear appropriate protective gloves and clothing to prevent skin exposure.
Clothing:
Wear appropriate protective clothing to minimize contact with skin.
Respirators:
Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****
Physical State: Not available.
Appearance: slightly beige
Odor: None reported.
pH: Not available.
Vapor Pressure: <1 mbar @ 20 C
Vapor Density: Not available.
Evaporation Rate: Not available.
Viscosity: Not available.
Boiling Point: 160 deg C @ .40mmHg
Freezing/Melting Point: 136.00 - 140.00 deg C
Decomposition Temperature: > 180 deg C
Solubility: practically insoluble
Specific Gravity/Density: Not available.
Molecular Formula: $C_8H_6Cl_2O_3$
Molecular Weight: 221.04

**** SECTION 10 - STABILITY AND REACTIVITY ****
Chemical Stability:
Stable under normal temperatures and pressures.

Conditions to Avoid:
Not available.
Incompatibilities with Other Materials:
Oxidizing agents - light.
Hazardous Decomposition Products:
Hydrogen chloride, carbon monoxide, carbon dioxide.
Hazardous Polymerization: Has not been reported.

**** SECTION 11 - TOXICOLOGICAL INFORMATION ****
RTECS#:
CAS# 94-75-7: AG6825000
LD50/LC50:
CAS# 94-75-7: Oral, mouse: LD50 = 347 mg/kg; Oral, rat: LD50 = 375 mg/kg; Skin, rabbit: LD50 = 1400 mg/kg; Skin, rat: LD50 = 1500 mg/kg.
Carcinogenicity:
2,4-Dichlorophenoxyacetic acid, 96% -
ACGIH: A4 - Not Classifiable as a Human Carcinogen

**** SECTION 12 - ECOLOGICAL INFORMATION ****
Ecotoxicity:
Not available.

**** SECTION 13 - DISPOSAL CONSIDERATIONS ****
Dispose of in a manner consistent with federal, state, and local regulations.
RCRA D-Series Maximum Concentration of Contaminants:
CAS# 94-75-7: waste number D016; regulatory level = 10.0 mg/L.
RCRA D-Series Chronic Toxicity Reference Levels: CAS# 94-75-7: chronic toxicity reference level = 0.1 mg/L.
RCRA F-Series: None listed.
RCRA P-Series: None listed.
RCRA U-Series: CAS# 94-75-7: waste number U240.
CAS# 94-75-7 is banned from land disposal according to RCRA.

**** SECTION 14 - TRANSPORT INFORMATION ****
US DOT
Shipping Name: PHENOXY PESTICIDES, SOLID, TOXIC, N.O.S. (2,4-DICHLOROPHENOXYACETIC ACID)
Hazard Class: 6.1
UN Number: UN2765
Packing Group: III
IMO
Shipping Name: PHENOXY PESTICIDE, SOLID, TOXIC
Hazard Class: 6.1
UN Number: 2765
Packing Group: III
IATA
Shipping Name: PHENOXY PESTICIDE, SOLID, TOXIC*
Hazard Class: 6.1
UN Number: 2765
Packing Group: III
RID/ADR
Shipping Name: PHENOXY PESTICIDE, SOLID, TOXIC
Dangerous Goods Code: 6.1(73C)
UN Number: 2765
Canadian TDG
Shipping Name: PHENOXY PESTICIDE SOLID TOXIC NOS (2,4DICHLOROPHENOXYACETIC ACID)
Hazard Class: 6.1(9.2)
UN Number: UN2765

**** SECTION 15 - REGULATORY INFORMATION ****
US FEDERAL
TSCA
CAS# 94-75-7 is listed on the TSCA inventory.
Health & Safety Reporting List
None of the chemicals are on the Health & Safety Reporting List.
Chemical Test Rules
None of the chemicals in this product are under a Chemical Test Rule.
Section 12b
CAS# 94-75-7: export notification required - Section 4
TSCA Significant New Use Rule
None of the chemicals in this material have a SNUR under TSCA.
SARA
Section 302 (RQ)
CAS# 94-75-7: final RQ = 100 pounds (45.4 kg)
Section 302 (TPQ)
None of the chemicals in this product have a TPQ.
SARA Codes
CAS # 94-75-7: acute, chronic, flammable.
Section 313
This chemical is not at a high enough concentration to be reportable
under Section 313.
No chemicals are reportable under Section 313.
Clean Air Act:
CAS# 94-75-7 is listed as a hazardous air pollutant (HAP).
This material does not contain any Class 1 Ozone depletors.
This material does not contain any Class 2 Ozone depletors.
Clean Water Act:
CAS# 94-75-7 is listed as a Hazardous Substance under the CWA.
None of the chemicals in this product are listed as Priority
Pollutants under the CWA.
None of the chemicals in this product are listed as Toxic Pollutants
under the CWA.
OSHA:
None of the chemicals in this product are considered highly hazardous
by OSHA.
STATE
2,4-Dichlorophenoxyacetic acid can be found on the following state right to know
lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.
California No Significant Risk Level:
None of the chemicals in this product are listed.
European/International Regulations
European Labeling in Accordance with EC Directives
Hazard Symbols: XN
Risk Phrases:
R 22 Harmful if swallowed.
R 36/37/38 Irritating to eyes, respiratory system and skin.
Safety Phrases:
S 36/37 Wear suitable protective clothing and gloves.
WGK (Water Danger/Protection)
CAS# 94-75-7: 2
Canada
CAS# 94-75-7 is listed on Canada's DSL/NDSL List.
This product does not have a WHMIS classification.
CAS# 94-75-7 is not listed on Canada's Ingredient Disclosure List.
Exposure Limits
CAS# 94-75-7:. OEL-AUSTRALIA:TWA 10 mg/m3. OEL-AUSTRIA:TWA 10 mg/m3
OEL-BELGIUM:TWA 10 mg/m3. OEL-DENMARK:TWA 5 mg/m3. OEL-FINLAND:TWA 10

mg/m3;STEL 20 mg/m3;Skin. OEL-FRANCE:TWA 10 mg/m3. OEL-GERMANY:TWA 10 mg/m3. OEL-HUNGARY:TWA 1 mg/m3;STEL 2 mg/m3;Skin. OEL-THE NETHERLANDS: TWA 10 mg/m3. OEL-THE PHILIPPINES:TWA 10 mg/m3. OEL-POLAND:TWA 7 mg/m3 . OEL-SWITZERLAND:TWA 10 mg/m3;STEL 50 mg/m3. OEL-THAILAND:TWA 10 mg/m 3. OEL-TURKEY:TWA 10 mg/m3. OEL-UNITED KINGDOM:TWA 10 mg/m3;STEL 20 mg /m3. OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV. OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

**** SECTION 16 - ADDITIONAL INFORMATION ****
MSDS Creation Date: 2/01/1996 Revision #1 Date: 9/02/1997
The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no way shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

SIGMA CHEMICAL -- 23478-8 TRIBUTYLTIN HYDRIDE, 97%
MATERIAL SAFETY DATA SHEET
NSN: 681000F046105
Manufacturer's CAGE: 21076
Part No. Indicator: A
Part Number/Trade Name: 23478-8 TRIBUTYLTIN HYDRIDE, 97%

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General Information

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Company's Name: SIGMA CHEMICAL COMPANY
Company's Street: 3050 SPRUCE ST
Company's P. O. Box: 14508
Company's City: SAINT LOUIS
Company's State: MO
Company's Country: US
Company's Zip Code: 63178-5000
Company's Emerg Ph #: 314-771-5765/800-325-3010
Company's Info Ph #: 314-771-5765/800-325-3010
Distributor/Vendor # 1: ALDRICH CHEMICAL CO SUB OF SIGMA-ALDRICH
Distributor/Vendor # 1 Cage: 60928
Distributor/Vendor # 2: FLUKA CHEMICAL CORP
Distributor/Vendor # 2 Cage: 63181
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SE
Date MSDS Prepared: 01JUL95
Safety Data Review Date: 18JAN96
Preparer's Company: SIGMA CHEMICAL COMPANY
Preparer's St Or P. O. Box: 3050 SPRUCE ST
Preparer's City: SAINT LOUIS
Preparer's State: MO
Preparer's Zip Code: 63178-5000
MSDS Serial Number: BYMNB

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: TRIBUTYLTIN HYDRIDE, STANNANE, TRIBUTYLSTANNANE,
TRIBUTYLSTANNIC HYDRIDE, TRIBUTYLTIN, TRI-N-BUTYL HYDRIDE *95-4*
Ingredient Sequence Number: 01
Percent: 97
NIOSH (RTECS) Number: WH8675000
CAS Number: 688-73-3

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Physical/Chemical Characteristics

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Appearance And Odor: CLEAR COLORLESS LIQUID
Boiling Point: 176F
Specific Gravity: 1.082

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Fire and Explosion Hazard Data

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Flash Point: 104F
Extinguishing Media: WATER SPRAY, CO2, DRY CHEMICAL POWDER/APPROPRIATE FOAM

Special Fire Fighting Proc: WEAR SELF CONTAINED BREATHING APPARATUS & PROTECTIVE CLOTHING TO PREVENT CONTACT W/SKIN & EYES.
Unusual Fire And Expl Hazrds: READILY REACTS W/WATER GENERATING FLAMMABLE/ EXPLOSIVE GASES. VAPOR MAY TRAVEL CONSIDERABLE DISTANCE TO AN IGNITION SOURCE & FLASHBACK. CONTAINER MAY EXPLODE.

Reactivity Data

Stability: YES
Cond To Avoid (Stability): SENSITIVE TO AIR, MOISTURE & LIGHT, HEAT, SPARKS, OPEN FLAME
Materials To Avoid: STRONG OXIDIZING AGENTS, STEEL & OTHER METALS
Hazardous Decomp Products: CO, CO2, TIN/TIN OXIDES
Hazardous Poly Occur: NO

Health Hazard Data

Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: HARMFUL IF SWALLOWED, INHALED/ABSORBED THROUGH SKIN. VAPOR/MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES & UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. MAY AFFECT THE CENTRAL NERVOUS SYSTEM.
Carcinogenicity - NTP: NO
Carcinogenicity - IARC: NO
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: NONE
Signs/Symptoms Of Overexp: IRRITATION, GASTROINTESTINAL DISTURBANCES, NAUSEA,VOMITING, DIARRHEA
Emergency/First Aid Proc: EYES/SKIN: IMMEDIATELY FLUSH W/COPIOUS AMOUNTS OF WATER FOR 15 MINS. INHALATION: REMOVE TO FRESH AIR. GIVE CPR/ OXYGEN IF NECESSARY. INGESTION: WASH OUT MOUTH W/WATER IF CONSICOUS. OBTAIN MEDICAL ATTENTION IN ALL CASES.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: EVACUATE. SHUT OFF ALL IGNITION SOURCES. WEAR SCBA, RUBBER BOOTS & HEAVY RUBBER GLOVES. COVER W/DRY-LIME, SAND/SODA ASH. PLACE IN COVERED CONTAINERS USING NON-SPARKING TOOLS & TRANSPORT OUTDOORS. VENTILATE AREA & WASH SITE AFTER PICKUP IS COMPLETE. Waste Disposal Method: BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER BUT EXERT CARE IN IGNITING AS THIS MATERIAL IS HIGHLY FLAMMABLE. DISPOSE OF IN ACCORDANCE W/LOCAL, STATE & FEDERAL REGULATIONS.
Precautions-Handling/Storing: KEEP TIGHTLY CLOSED & AWAY FROM HEAT, SPARKS & OPEN FLAME. USE NONSPARKING TOOLS. HANDLE & STORE UNDER NITROGEN. AVOID CONTACT W/METALS. REFRIGERATE.
Other Precautions: DON'T BREATHE VAPOR. DON'T GET IN EYES, ON SKIN & ON CLOTHING. AVOID PROLONGED & REPEATED EXPOSURE. WEAR SUITABLE PROTECTIVE CLOTHING, GLOVES & EYE/FACE PROTECTION.

Control Measures

Respiratory Protection: WEAR APPROPRIATE NIOSH/MSHA-APPROVED RESPIRATOR.
Ventilation: USE ONLY IN A CHEMICAL FUME HOOD
Protective Gloves: CHEMICAL-RESISTANT

Eye Protection: SAFETY GOGGLES
Other Protective Equipment: PROTECTIVE CLOTHING, SAFETY SHOWER, EYE BATH
Work Hygienic Practices: REMOVE/LAUNDER CONTAMINATED CLOTHING BEFORE REUSE. REMOVE/DISCARD CONTAMINATED SHOES. WASH THOROUGHLY AFTER HANDLING.

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Transportation Data

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Disposal Data

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Label Data

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Label Required: YES
Label Status: G
Common Name: 23478-8 TRIBUTYLTIN HYDRIDE, 97%
Special Hazard Precautions: HARMFUL IF SWALLOWED, INHALED/ABSORBED THROUGH SKIN. VAPOR/MIST IS IRRITATING TO THE EYES, MUCOUS MEMBRANES & UPPER RESPIRATORY TRACT. CAUSES SKIN IRRITATION. MAY AFFECT THE CENTRAL NERVOUS SYSTEM. IRRITATION, GASTROINTESTINAL DISTURBANCES, NAUSEA,VOMITING, DIARRHEA
Label Name: SIGMA CHEMICAL COMPANY
Label Street: 3050 SPRUCE ST
Label P.O. Box: 14508
Label City: SAINT LOUIS
Label State: MO
Label Zip Code: 63178-5000
Label Country: US
Label Emergency Number: 314-771-5765/800-325-3010

Common Name: Polychlorinated Biphenyls
CAS Number: 1336-36-3
DOT Number: UN 2315
Date: May, 1989

HAZARD SUMMARY
* Polychlorinated Biphenyls can affect you when breathed in and by passing through your skin.
* Polychlorinated Biphenyls are CARCINOGENS HANDLE WITH EXTREME CAUTION.
* They may be teratogens and may damage the adult reproductive system.
* Exposure can cause an acne like skin rash (called chloracne).
* They can damage the liver.
* High exposure can damage the nervous system, causing numbness, weakness and tingling ("pins and needles") in the arms and legs.

IDENTIFICATION
Polychlorinated Biphenyls are a mixture of chemicals that are clear to yellow oily liquids or solids. They are used in insulating fluids of electrical systems.

REASON FOR CITATION
* Polychlorinated Biphenyls are on the Hazardous Substance List because they are regulated by OSHA and cited by NIOSH, DOT, IARC, NTP, DEP and EPA.
* These chemicals are on the Special Health Hazard Substance List because they are CARCINOGENS and TERATOGENS.
* Definitions are attached.

HOW TO DETERMINE IF YOU ARE BEING EXPOSED
* Exposure to hazardous substances should be routinely evaluated. This may include collecting personal and area air samples. You can obtain copies of sampling results from your employer. You have a legal right to this information under OSHA 1910.20.
* If you think you are experiencing any work related health problems, see a doctor trained to recognize occupational diseases. Take this Fact Sheet with you.

WORKPLACE EXPOSURE LIMITS
OSHA: The legal airborne permissible exposure limit (PEL) is 1 mg/m3 (42% Chlorine) and 0.5 mg/m3 (54% Chlorine) averaged over an 8 hour workshift.
NIOSH: The recommended airborne exposure limit is 0.001 mg/m3 averaged over a 10 hour workshift.

* The above exposure limits are for air levels only. When skin contact also occurs, you may be overexposed, even though air levels are less than the limits listed above.
* Polychlorinated Biphenyls are PROBABLE CANCER CAUSING AGENTS in humans. There may be no safe level of exposure to carcinogens, so all contact should be reduced to the lowest

possible level.

WAYS OF REDUCING EXPOSURE
* Where possible, enclose operations and use local exhaust ventilation at the site of chemical release. If local exhaust ventilation or enclosure is not used, respirators should be worn.
* A regulated, marked area should be established where Polychlorinated Biphenyls are handled, used, or stored as recommended by NIOSH.
* Wear full body protective work clothing.
* Wash thoroughly immediately after exposure to Polychlorinated Biphenyls and on exit from the work area.
* Post hazard and warning information in the work area. In addition, as part of an ongoing education and training effort, communicate all information on the health and safety hazards of Polychlorinated Biphenyls to potentially exposed workers.

This Fact Sheet is a summary source of information of all potential and most severe health hazards that may result from exposure. Duration of exposure, concentration of the substance and other factors will affect your susceptibility to any of the potential effects described below.

HEALTH HAZARD INFORMATION

Acute Health Effects
The following acute (short term) health effects may occur immediately or shortly after exposure to Polychlorinated Biphenyls:

* Exposure to the vapor can irritate the eyes, nose and throat.
* High exposures can damage the liver.

Chronic Health Effects
The following chronic (long term) health effects can occur at some time after exposure to Polychlorinated Biphenyls and can last for months or years:

Cancer Hazard
* Polychlorinated Biphenyls are PROBABLE CARCINOGENS in humans. There is some limited evidence that they cause skin cancer in humans and they have been shown to cause liver cancer in animals.
* Many scientists believe there is no safe level of exposure to a CARCINOGEN. Such substances may also have the potential for causing reproductive damage in humans.

Reproductive Hazard
* Polychlorinated Biphenyls may be TERATOGENS in humans since they have been shown to be teratogens in animals.
* They may be passed to a child through mother's milk.
* Polychlorinated Biphenyls can affect the reproductive system of adults.

Other Long Term Effects
* Repeated exposures can cause liver damage.
* Polychlorinated Biphenyls can cause a severe acne like rash (chloracne). This may persist for years.
* High exposures can damage the nervous system, causing numbness, weakness, and tingling ("pins and needles") in the arms and legs.

MEDICAL

Medical Testing
Before beginning employment and at regular times after that, the following are recommended:

* Liver function tests.
* Serum triglycerides level.
* Exam of the skin.

If symptoms develop or overexposure is suspected, the following may be useful:

* Blood PCB levels.
* Nerve conduction studies should be considered.

Any evaluation should include a careful history of past and present symptoms with an exam. Medical tests that look for damage already done are not a substitute for controlling exposure.

Request copies of your medical testing. You have a legal right to this information under OSHA 1910.20.

Mixed Exposures
Because more than light alcohol consumption can cause liver damage, drinking alcohol can increase the liver damage caused by Polychlorinated Biphenyls.

WORKPLACE CONTROLS AND PRACTICES

Unless a less toxic chemical can be substituted for a hazardous substance, ENGINEERING CONTROLS are the most effective way of reducing exposure. The best protection is to enclose operations and/or provide local exhaust ventilation at the site of chemical release. Isolating operations can also reduce exposure. Using respirators or protective equipment is less effective than the controls mentioned above, but is sometimes necessary.

in place for highly toxic chemicals or when significant skin, eye, or breathing exposures are possible.

In addition, the following controls are recommended:

* Where possible, automatically transfer Polychlorinated Biphenyls from drums or other storage containers to process containers.

* Specific engineering controls are recommended for this chemical by NIOSH. Refer to the NIOSH criteria document: Occupational Exposure to Polychlorinated Biphenyls #77 225.

Good WORK PRACTICES can help to reduce hazardous exposures. The following work practices are recommended:

* Workers whose clothing has been contaminated by Polychlorinated Biphenyls should change into clean clothing promptly.
* Do not take contaminated work clothes home. Family members could be exposed.
* Contaminated work clothes should be laundered by individuals who have been informed of the hazards of exposure to Polychlorinated Biphenyls.
* If there is the possibility of skin exposure, emergency shower facilities should be provided.
* On skin contact with Polychlorinated Biphenyls, immediately wash or shower to remove the chemical. At the end of the workshift, wash any areas of the body that may have contacted Polychlorinated Biphenyls, whether or not known skin contact has occurred.
* Do not eat, smoke, or drink where Polychlorinated Biphenyls are handled, processed, or stored, since the chemicals can be swallowed. Wash hands carefully before eating or smoking.
* If solid, when vacuuming, a high efficiency particulate absolute (HEPA) filter should be used, not a standard shop vacuum.

PERSONAL PROTECTIVE EQUIPMENT

WORKPLACE CONTROLS ARE BETTER THAN PERSONAL PROTECTIVE EQUIPMENT. However, for some jobs (such as outside work, confined space entry, jobs done only once in a while, or jobs done while workplace controls are being installed), personal protective equipment may be appropriate.

The following recommendations are only guidelines and may not apply to every situation.

Clothing
* Avoid skin contact with Polychlorinated Biphenyls. Wear protective gloves and clothing. Safety equipment suppliers/ manufacturers can provide recommendations on the most protective glove/ clothing material for your operation.
* All protective clothing (suits, gloves, footwear, headgear) should be clean, available each day, and put on before work.
* Viton is recommended as a good protective material.

Eye Protection
* Eye protection is included in the recommended respiratory protection.

Respiratory Protection
IMPROPER USE OF RESPIRATORS IS DANGEROUS. Such equipment should

only be used if the employer has a written program that takes into account workplace conditions, requirements for worker training, respirator fit testing and medical exams, as described in OSHA 1910.134.

* At any exposure level, use a MSHA/NIOSH approved supplied air respirator with a full facepiece operated in the positive pressure mode or with a full facepiece, hood, or helmet in the continuous flow mode, or use a MSHA/NIOSH approved self contained breathing apparatus with a full facepiece operated in pressure demand or other positive pressure mode.

Common Name: Polychlorinated Biphenyls
DOT Number: UN 2315
DOT Emergency Guide code: 15
CAS Number: 1336-36-3

Hazard rating	NJ DOH	NFPA
FLAMMABILITY	Not Found	Not Rated
REACTIVITY	Not Found	Not Rated

CARCINOGEN
POISONOUS GASES ARE PRODUCED IN FIRE

Hazard Rating Key: 0=minimal; 1=slight; 2=moderate; 3=serious; 4=severe

FIRE HAZARDS

* Polychlorinated Biphenyls may burn, but do not readily ignite.
* Use dry chemical, CO2, water spray, or foam extinguishers.
* POISONOUS GASES ARE PRODUCED IN FIRE, including Dioxin and Chlorinated Dibenzofurans.
* If employees are expected to fight fires, they must be trained and equipped as stated in OSHA 1910.156.

SPILLS AND EMERGENCIES

If Polychlorinated Biphenyls are spilled or leaked, take the following steps:

* Restrict persons not wearing protective equipment from area of spill or leak until clean up is complete.
* Ventilate the area of spill or leak.
* Absorb liquids in vermiculite, dry sand, earth, or a similar material and deposit in sealed containers.
* Collect powdered material in the most convenient and safe manner and deposit in sealed containers.
* It may be necessary to contain and dispose of Polychlorinated Biphenyls as a HAZARDOUS WASTE. Contact your State Environmental Program for specific recommendations.

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FOR LARGE SPILLS AND FIRES immediately call your fire department.

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HANDLING AND STORAGE

* Prior to working with Polychlorinated Biphenyls you should be trained on their proper handling and storage.
* Store in tightly closed containers in a cool well ventilated area away from STRONG OXIDIZERS (such as CHLORINE, BROMINE, and FLUORINE).
* Polychlorinated Biphenyls should be handled only in an established, controlled, regulated area.

FIRST AID
POISON INFORMATION

Eye Contact
* Immediately flush with large amounts of water for at least 15 minutes, occasionally lifting upper and lower lids.

Skin Contact
* Quickly remove contaminated clothing. Immediately wash contaminated skin with large amounts of soap and water.

Breathing
* Remove the person from exposure.
* Begin rescue breathing if breathing has stopped and CPR if heart action has stopped.
* Transfer promptly to a medical facility.

PHYSICAL DATA

Flash Point: 383oF (195oC)
Water Solubility: Slightly soluble

Other Names and Formulations:

This Fact Sheet can be used for the following substances:

PCB 1242 (Chlorodiphenyl 42% Chlorine) CAS # 53469 21 9;
PCB 1254 (Chlorodiphenyl 54% Chlorine) CAS # 11097 69 1.

NEW JERSEY DEPARTMENT OF HEALTH
Right to Know Program
CN 368, Trenton, NJ 08625 0368

ECOLOGICAL INFORMATION

Polychlorinated biphenyls are complex mixtures of chlorobiphenyls which have been marketed for uses according to the percentage of chlorine in the mixture. The lesser chlorinated PCBs are colorless mobile liquids. Increased chlorination produces more viscous

liquids, with further chlorination producing sticky resins or white powders. Because of their heat stability, PCBs were commonly used in electrical capacitors and transformers, and industrial heat transfer applications. PCBs may enter the environment from leakage from industrial and electrical equipment, from industrial discharges, spills, leaching from municipal landfills, and from previously contaminated sediments.

ACUTE (SHORT-TERM) ECOLOGICAL EFFECTS

Acute toxic effects may include the death of animals, birds, or fish, and death or low growth rate in plants. Acute effects are seen two to four days after animals or plants come in contact with a toxic chemical substance.

Polychlorinated biphenyls have high acute toxicity to aquatic life. Insufficient data are available to evaluate or predict the short-term effects of PCBs to plants, birds, or land animals.

CHRONIC (LONG-TERM) ECOLOGICAL EFFECTS

Chronic toxic effects may include shortened lifespan, reproductive problems, lower fertility, and changes in appearance or behavior. Chronic effects can be seen long after first exposure(s) to a toxic chemical.

Polychlorinated biphenyls have high chronic toxicity to aquatic life. Insufficient data are available to evaluate or predict the long-term effects of PCBs to plants, birds, or land animals.

WATER SOLUBILITY

Polychlorinated biphenyls are slightly soluble in water. Concentrations of less than 1 milligram will mix with a liter of water.

DISTRIBUTION AND PERSISTENCE IN THE ENVIRONMENT

The relative distribution of the various PCBs depends on the level of chlorination. Some PCBs will probably be highly persistent in water, with half-lives greater than 200 days. Potential PCB distribution in the various environmental compartments can have the following ranges, depending on degree of chlorination: air, 0-34%; terrestrial soils, 33-52%; water, 0-1.8%; suspended solids, 0.05-0.08%; aquatic biota, 0.02-0.03%; aquatic sediments, 30-50%.

BIOACCUMULATION IN AQUATIC ORGANISMS

Some substances increase in concentration, or bioaccumulate, in living organisms as they breathe contaminated air, drink contaminated water, or eat contaminated food. These chemicals can become concentrated in the tissues and internal organs of animals and humans.

The concentration of polychlorinated biphenyls found in fish

tissues is expected to be considerably higher than the average concentration of PCBs in the water from which the fish was taken.

SUPPORT DOCUMENT: AQUIRE Database, ERL-Duluth, U.S. EPA., EEB OCB risk document

CHEM SERVICE -- PS-699 P,P-DDT
MATERIAL SAFETY DATA SHEET
NSN: 681000F018278
Manufacturer's CAGE: 8Y898
Part No. Indicator: A
Part Number/Trade Name: PS-699 P,P-DDT

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General Information

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Company's Name: CHEM SERVICE INC
Company's P. O. Box: 3108
Company's City: WEST CHESTER
Company's State: PA
Company's Zip Code: 19381
Company's Emerg Ph #: (215) 386-2100
Company's Info Ph #: (215) 386-2100
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Date MSDS Prepared: 10JUL90
Safety Data Review Date: 03SEP90
Preparer's Company: CHEM SERVICE INC
Preparer's City: WEST CHESTER
Preparer's State: PA
Preparer's Zip Code: 19381
MSDS Serial Number: BKXPC

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: DDT (DICHLORODIPHENYLTRICHLOROETHANE) (SARA III)
Ingredient Sequence Number: 01
Percent: 98%
NIOSH (RTECS) Number: KJ3325000
CAS Number: 50-29-3
OSHA PEL: S, 1 MG/M3
ACGIH TLV: 1 MG/M3; 9192

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Physical/Chemical Characteristics

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Appearance And Odor: COLORLESS, CRYSTALLINE SOLID, NO ODOR.
Melting Point: 227.3F
Vapor Pressure (MM Hg/70 F): 7
Solubility In Water: INSOLUBLE

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Fire and Explosion Hazard Data

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Extinguishing Media: CO2, DRY CHEMICAL POWDER OR SPRAY.
Unusual Fire And Expl Hazrds: NO EXPLOSION LIMITS ARE AVAILABLE FOR THIS COMPOUND.

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Reactivity Data

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Stability: YES
Cond To Avoid (Stability): SENSITIVE TO HEAT & LIGHT - DARK COLOR DOESN'T AFFECT PURITY.

Materials To Avoid: IRON, ZINC & OTHER LIGHT METALS, STRONG BASES, STRONG OXIDIZING AGENTS. MAGNESIUM/ALUMINUM OR THEIR ALLOYS.
Hazardous Decomp Products: WILL DECOMPOSE UNDER ALKALINE CONDITIONS
Hazardous Poly Occur: NO

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Health Hazard Data

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LD50-LC50 Mixture: ORAL RAT LD50: 87 MG/KG
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: SKIN: FATAL IF ABSORBED, IRRITATION, FATAL, LIVER/KIDNEY/NERVOUS SYSTEM INJURY, BLOOD DISORDERS, NAUSEA, HEADACHE, DIZZINESS, CARDIOVASCULAR SYSTEM INJUIRY. INGESTION: FATAL.
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: NO
Explanation Carcinogenicity: DDT IS A 2B ANIMAL CARCINOGEN.
Signs/Symptoms Of Overexp: SKIN: IRRITATION, FATAL IF ABSORBED, SENSITIZATION, ALLERGIC REACTION. INGESTION: FATAL. EYES: IRRITATION, DAMAGE. INHALATION: FATAL, LIVER/KIDNEY/NERVOUS SYSTEM INJURY, BLOOD DISORDERS, NAUSEA, HEADACHE, DIZZINESS, CARDIOVASCULAR SYSTEM INJURY.
Med Cond Aggravated By Exp: BLOOD DISORDERS
Emergency/First Aid Proc: EYES/SKIN: FLUSH W/WATER FOR 15-20 MINS. IF NO BURNS HAVE OCCURED-USE SOAP & WATER TO CLEANSE SKIN. INHALATION: REMOVE TO FRESH AIR. ADMINISTER OXYGEN IF BREATHING IS DIFFICULT. IF EXPERIENCES CARDIAC ARREST ADMINISTER CPR. IF EXHIBITING SIGNS OF SHOCK. KEEP WARM/ QUIET. INGESTION: INDUCE VOMITING. DON'T ADMINISTER LIQUIDS/INDUCE VOMITING TO AN UNCONSCIOUS/CONVULSING PERSON. OBTAIN MED ATTN.

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Precautions for Safe Handling and Use

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Steps If Matl Released/Spill: EVACUATE AREA. WEAR APPROPRIATE EQUIPMENT. VENTILATE AREA. SWEEP UP & PLACE IN AN APPROPRIATE CONTAINER. WASH CONTAMINATED SURFACES TO REMOVE ANY RESIDUES.
Waste Disposal Method: BURN IN A CHEMICAL INCINERATOR EQUIPPED W/AN AFTERBURNER & SCRUBBER. DISPOSE OF IN ACCORDANCE W/FEDERAL, STATE, & LOCAL REGULATIONS.
Precautions-Handling/Storing: AVOID DIRECT PHYSICAL CONTACT. DON'T WEAR CONTACT LENSES IN THE LABORATORY. FOR LABORATORY USE ONLY.
Other Precautions: KEEP TIGHTLY CLOSED IN A COOL DRY PLACE. STORE W/ COMPATIBLE CHEMICALS. PRODUCT MAY NOT BE USED AS DRUGS/COSMETICS/ AGRICULTURAL/PESTICIDAL PRODUCTS/FOOD ADDITIVES/HOUSEHOLD CHEMICALS. AVOID CONTACT W/SKIN, EYES/CLOTHING.

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Control Measures

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Respiratory Protection: USE APPROPRIATE OSHA/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation: CHEMICAL SHOULD BE HANDLED ONLY IN A HOOD.
Protective Gloves: AS REQUIRED
Eye Protection: EYE SHIELDS
Other Protective Equipment: AS REQUIRED
Work Hygienic Practices: REMOVE/WASH CONTAMINATED CLOTHING BEFORE REUSE.
Suppl. Safety & Health Data: AN ANTIDOTE IS A SUBSTANCE INTENDED TO

COUNTERACT THE EFFECT OF A POISON. IT SHOULD BE ADMINISTERED ONLY BY A PHYSICIAN/TRAINED EMERGENCY PERSONNEL. IF PATIENT IS VOMITING, WATCH CLOSELY TO MAKE SURE AIRWAY DOESN'T BECOME OBSTRACTED BY VOMIT.

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Transportation Data

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Disposal Data

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Label Data

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Label Required: YES
Label Status: G
Common Name: PS-699 P,P-DDT
Special Hazard Precautions: SKIN: FATAL IF ABSORBED, IRRITATION, FATAL, LIVER/KIDNEY/NERVOUS SYSTEM INJURY, BLOOD DISORDERS, NAUSEA, FATAL. EYES: IRRITATION, DAMAGE. INHALATION: FATAL, LIVER/KIDNEY/NERVOUS SYSTEM INJURY, BLOOD DISORDERS, NAUSEA, HEADACHE, DIZZINESS, CARDIOVASCULAR SYSTEM INJURY.
Label Name: CHEM SERVICE INC
Label P.O. Box: 3108
Label City: WEST CHESTER
Label State: PA
Label Zip Code: 19381
Label Emergency Number: (215) 386-2100

ULTRA SCIENTIFIC -- US-106NS, POLYNUCLEAR AROMATIC HYDROCARBONS
MATERIAL SAFETY DATA SHEET
NSN: 664000N070028
Manufacturer's CAGE: 0MU35
Part No. Indicator: A
Part Number/Trade Name: US-106NS, POLYNUCLEAR AROMATIC HYDROCARBONS
(SUPDAT)

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General Information

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Company's Name: ULTRA SCIENTIFIC
Company's Street: 250 SMITH ST
Company's City: NORTH KINGSTOWN
Company's State: RI
Company's Country: US
Company's Zip Code: 02852
Company's Emerg Ph #: 401-294-9400
Company's Info Ph #: 401-294-9400
Record No. For Safety Entry: 001
Tot Safety Entries This Stk#: 001
Status: SMJ
Date MSDS Prepared: 18JUL95
Safety Data Review Date: 23APR96
MSDS Serial Number: BZSPG

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Ingredients/Identity Information

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Proprietary: NO
Ingredient: METHANE, DICHLORO-; (METHYLENE CHLORIDE) (SARA 313) (CERCLA)
LD50(ORAL,RAT):2136 MG/KG
Ingredient Sequence Number: 01
Percent: 48.54
NIOSH (RTECS) Number: PA8050000
CAS Number: 75-09-2
OSHA PEL: 500 PPM
ACGIH TLV: 50 PPM, A2

Proprietary: NO
Ingredient: BENZENE (SARA 313) (CERCLA) LD50(ORAL,RAT):3320 MG/KG
Ingredient Sequence Number: 02
Percent: 48.54
NIOSH (RTECS) Number: CY1400000
CAS Number: 71-43-2
OSHA PEL: SEE 1910.1028
ACGIH TLV: 10 PPM; A2

Proprietary: NO
Ingredient: ACENAPHTHENE (CERCLA)
Ingredient Sequence Number: 03
Percent: 0.182
NIOSH (RTECS) Number: AB1000000
CAS Number: 83-32-9
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: ACENAPHTHYLENE (CERCLA)
Ingredient Sequence Number: 04
Percent: 0.182
NIOSH (RTECS) Number: AB1254000
CAS Number: 208-96-8
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: ANTHRACENE (SARA 313) (CERCLA)
Ingredient Sequence Number: 05
Percent: 0.182
NIOSH (RTECS) Number: CA9350000
CAS Number: 120-12-7
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: BENZ(A)ANTHRACENE (CERCLA)
Ingredient Sequence Number: 06
Percent: 0.182
NIOSH (RTECS) Number: CV9275000
CAS Number: 56-55-3
OSHA PEL: N/K (FP N)
ACGIH TLV: A2

Proprietary: NO
Ingredient: BENZ(E)ACEPHENANTHRYLENE; (BENZO[B]FLUORANTHENE) (CERCLA)
Ingredient Sequence Number: 07
Percent: 0.182
NIOSH (RTECS) Number: CU1400000
CAS Number: 205-99-2
OSHA PEL: N/K (FP N)
ACGIH TLV: A2

Proprietary: NO
Ingredient: BENZO(K)FLUORANTHENE (CERCLA)
Ingredient Sequence Number: 08
Percent: 0.182
NIOSH (RTECS) Number: DF6350000
CAS Number: 207-08-9
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: BENZO(GHI)PERYLENE (CERCLA)
Ingredient Sequence Number: 09
Percent: 0.182
NIOSH (RTECS) Number: DI6200500
CAS Number: 191-24-2
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO

Ingredient: BENZO(A)PYRENE (CERCLA)
Ingredient Sequence Number: 10
Percent: 0.182
NIOSH (RTECS) Number: DJ3675000
CAS Number: 50-32-8
OSHA PEL: 0.2 MG/M3
ACGIH TLV: A2

Proprietary: NO
Ingredient: CHRYSENE (CERCLA)
Ingredient Sequence Number: 11
Percent: 0.182
NIOSH (RTECS) Number: GC0700000
CAS Number: 218-01-9
OSHA PEL: 0.2 MG/M3
ACGIH TLV: A2

Proprietary: NO
Ingredient: DIBENZ(A,H)ANTHRACENE (CERCLA)
Ingredient Sequence Number: 12
Percent: 0.182
NIOSH (RTECS) Number: AN2625000
CAS Number: 53-70-3
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: FLUORANTHENE (CERCLA) LD50(ORAL,RAT):2000 MG/KG
Ingredient Sequence Number: 13
Percent: 0.182
NIOSH (RTECS) Number: LL4025000
CAS Number: 206-44-0
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: FLUORENE (CERCLA)
Ingredient Sequence Number: 14
Percent: 0.182
NIOSH (RTECS) Number: LL5670000
CAS Number: 86-73-7
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: INDENO(1,2,3-CD)PYRENE (CERCLA)
Ingredient Sequence Number: 15
Percent: 0.182
NIOSH (RTECS) Number: NK9300000
CAS Number: 193-39-5
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: NAPHTHALENE (SARA 313) (CERCLA) LD50(ORAL,RAT):1780 MG/KG

Ingredient Sequence Number: 16
Percent: 0.182
NIOSH (RTECS) Number: QJ0525000
CAS Number: 91-20-3
OSHA PEL: 10 PPM
ACGIH TLV: 10 PPM/15 STEL

Proprietary: NO
Ingredient: PHENANTHRENE (CERCLA) LD50(ORAL,RAT):700 MG/KG
Ingredient Sequence Number: 17
Percent: 0.182
NIOSH (RTECS) Number: SF7175000
CAS Number: 85-01-8
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: PYRENE (SARA 302) (CERCLA)
Ingredient Sequence Number: 18
Percent: 0.182
NIOSH (RTECS) Number: UR2450000
CAS Number: 129-00-0
OSHA PEL: N/K (FP N)
ACGIH TLV: N/K (FP N)

Proprietary: NO
Ingredient: SUPDAT:BENZ(A)ANTHRACENE; BENZO(A)PYRENE; DIBENZ(A,H)
ANTHRACENE:IARC MONOGRAPHS, SUPP, VOL 7, PG 56, 1987:GROUP (ING 20)
Ingredient Sequence Number: 19
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 19:2A. ANIMAL:LUNG, SKIN, KIDNEYS. NTP 7TH ANNUAL RPT ON
CARCINOGENS; 1994:ANTIC TO BE CARCINOGEN. (ING 21)
Ingredient Sequence Number: 20
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 20:BENZ(E)ACEPHENATHRYLENE; BENZO(K)FLUOROANTHENE;
INDENO(1,2,3-CD)PYRENE:IARC MONOGRAPHS, SUPP, VOL 7, PG (ING 22)
Ingredient Sequence Number: 21
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 21:56, 1987:GROUP 2B. NTP 7TH ANNUAL RPT ON CARCINOGENS.
1994:ANTIC TO BE CARCINOGEN. ANIMAL:LUNG, SKIN, (ING 23)
Ingredient Sequence Number: 22
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE

ACGIH TLV: NOT APPLICABLE

Proprietary: NO
Ingredient: ING 22:KIDNEYS. METHYLENE CHLORIDE:IARC MONOGRAPHS, SUPP, VOL 7, PG 194, 1987:GROUP 2B. NTP 7TH ANNUAL RPT (ING 24)
Ingredient Sequence Number: 23
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Proprietary: NO
LUNG.
Ingredient Sequence Number: 24
NIOSH (RTECS) Number: 9999999ZZ
OSHA PEL: NOT APPLICABLE
ACGIH TLV: NOT APPLICABLE

Physical/Chemical Characteristics

Appearance And Odor: LIQUID

Fire and Explosion Hazard Data

Flash Point: NOT APPLICABLE
Extinguishing Media: CARBON DIOXIDE, DRY CHEMICAL POWDER, OR WATER SPRAY.
Special Fire Fighting Proc: WEAR NIOSH/MSHA APPROVED PRESSURE DEMAND SCBA & FULL PROTECTIVE EQUIPMENT (FP N).
Unusual Fire And Expl Hazrds: THERMAL DECOMPOSITION PRODUCTS MAY INCLUDE HCL AND PHOSGENE (FP N).

Reactivity Data

Stability: YES
Cond To Avoid (Stability): NONE SPECIFIED BY MANUFACTURER.
Materials To Avoid: STRONG OXIDIZERS.
Hazardous Decomp Products: NOT APPLICABLE. HCL, PHOSGENE (FP N).
Hazardous Poly Occur: NO
Conditions To Avoid (Poly): NOT RELEVANT

Health Hazard Data

LD50-LC50 Mixture: SEE INGREDIENTS.
Route Of Entry - Inhalation: YES
Route Of Entry - Skin: YES
Route Of Entry - Ingestion: YES
Health Haz Acute And Chronic: TOXIC; IRRITANT. ALL CHEMICALS SHOULD BE CONSIDERED HAZARDOUS-DIRECT PHYSICAL CONTACT SHOULD BE AVOIDED. CHLOROCARBON MATERIALS HAVE PRODUCED SENSITIZATION OF THE MYOCARDIUM TO EPINEPHRINE IN LAB ANIMALS & COULD HAVE A SIMILAR EFT IN HUMANS. ADRENOMIMETICS (E.G., EPINEPHRINE) MAY BE CONTRAINDICATED (EFTS OF OVEREXP)
Carcinogenicity - NTP: YES
Carcinogenicity - IARC: YES
Carcinogenicity - OSHA: YES
Explanation Carcinogenicity: BENZENE:IARC MONOGRAPHS, SUPP, VOL 7, PG 120, 1987:GROUP 1. NTP 7TH ANNUAL RPT ON CARCINS. 1994:KNOWN TO BE (SUPDAT)

Signs/Symptoms Of Overexp: HLTH HAZS:EXCEPT FOR LIFE SUSTAINING USES IN HUMANS ACUTELY OR CHRONICALLY EXPOSED TO CHLORCARBONS (FP N).
Med Cond Aggravated By Exp: NONE SPECIFIED BY MANUFACTURER.
Emergency/First Aid Proc: INGESTION:CALL MD IMMEDIATELY (FP N). EYE: FLUSH WITH COPIOUS AMOUNTS OF WATER FOR AT LEAST 15 MINUTES. SKIN:FLUSH WITH COPIOUS AMOUNTS OF WATER. INHALATION:REMOVE TO FRESH AIR-GIVE OXYGEN, IF NECESSARY. CONTACT PHYSICIAN.

Precautions for Safe Handling and Use

Steps If Matl Released/Spill: DUE TO THE SMALL QUANTITY INVOLVED, SPILLS OR LEAKS SHOULD NOT POSE A SIGNIFICANT PROBLEM. A LEAKING BOTTLE MAY BE PLACED IN A PLASTIC BAG AND NORMAL DISPOSAL PROCEDURES FOLLOWED. LIQUID SAMPLES MAY BE ABSORBED ON VERMICULITE OR SAND.
Neutralizing Agent: NONE SPECIFIED BY MANUFACTURER.
Waste Disposal Method: OBSERVE ALL FEDERAL, STATE AND LOCAL LAWS CONCERNING DISPOSAL.
Precautions-Handling/Storing: KEEP TIGHTLY AT AND STORE IN A COOL, DRY PLACE. THIS MATERIAL SHOULD ONLY BE USED BY THOSE PERSONS TRAINED IN THE SAFE HANDLING OF HAZARDOUS CHEMS.
Other Precautions: NO SMOKING IN AREA OF USE. DO NOT USE IN THE GENERAL VICINITY OF ARC WELDING, OPEN FLAMES OR HOT SURFACES. HEAT AND/OR UV RADIATION MAY CAUSE THE FORMATION OF HCL AND/OR PHOSGENE (FP N).

Control Measures

Respiratory Protection: USE NIOSH/MSHA APPROVED RESPIRATOR APPROPRIATE FOR EXPOSURE OF CONCERN (FP N). USE APPROPRIATE OSHA/NIOSH/MSHA APPROVED SAFETY EQUIPMENT.
Ventilation: NONE SPECIFIED BY MANUFACTURER.
Protective Gloves: IMPERVIOUS GLOVES (FP N).
Eye Protection: ANSI APPROVED CHEM WORKERS GOGGS(SUPDAT)
Other Protective Equipment: ANSI APPRVD EMER EYEWASH & DELUGE SHOWER (FP N). WEAR CHEM RESIST CLTHG SUCH AS LAB COAT &/OR RUB APRON TO PVNT (SUPDAT)
Work Hygienic Practices: NONE SPECIFIED BY MANUFACTURER.
Suppl. Safety & Health Data: MFR TRADE/PART #:MIXTURE AT 2000 UG/ML IN METHYLENE CHLORIDE/BENZENE (1:1). EYE PROT:AND FULL LENGTH FACE SHIELD (FP N). OTHER PROT EQUIP:CONTACT WITH EYES, SKIN AND CLOTHING. EXPLAN OF MYELOID LEUKEMIA, HODGKINS DISEASE, LYMPHOMA. (ING 19)

Label Data

Label Required: YES
Technical Review Date: 23APR96
Label Status: G
Common Name: US-106NS, POLYNUCLEAR AROMATIC HYDROCARBONS (SUPDAT)
Chronic Hazard: YES
Signal Word: WARNING!
Acute Health Hazard-Moderate: X
Contact Hazard-Slight: X
Fire Hazard-None: X
Reactivity Hazard-None: X
Special Hazard Precautions: ACUTE:INHALATION OF VAPORS MAY CONTRIBUTE TO CANCER HAZARD. CONTAINS BENZENE, METHYLENE CHLORIDE, BENZ(E)

ACEPHENOTHRYLENE, BENZ(A)ANTHRACENE, BENZO(K)FLUORANTHENE, BENZO(A)PYRENE, DIBENZ(A,H)ANTHRACENE, INDENO(1,2,3-CD)PYRENE WHICH ARE LISTED AS HUMAN BLOOD & ANIMAL LUNG, SKIN AND KIDNEY CARCINOGENS (FP N).
Protect Eye: Y
Protect Skin: Y
Protect Respiratory: Y
Label Name: ULTRA SCIENTIFIC
Label Street: 250 SMITH ST
Label City: NORTH KINGSTOWN
Label State: RI
Label Zip Code: 02852
Label Country: US
Label Emergency Number: 401-294-9400

MATERIAL SAFETY DATA SHEET
I PRODUCT IDENTIFICATION
Trade Name: Arsenic Formula:As
Molecular Weight: 74.91 CAS #: 7440-38-2

II HAZARDOUS INGREDIENTS
PEL (mg/m 3): OSHA: 0.01 ACGIH: 0.2
SARA Title III Sect. 313 Chem: Yes Weight %: 99.99+

III PHYSICAL DATA
Boiling Point (o C): Not applicable Melting Point (o C): Sublimes at 613
Vapor Density (Air=1): Not applicable Evaporation Rate: N/A
Solubility in H 2 O: Insoluble pH: N/A
Appearance and Odor: Gray-black metal, odorless. Specific gravity (H 2 O=1): 5.72

IV FIRE AND EXPLOSION HAZARDS DATA
Flash Point (Method used): N/A Autoignition Temp (o C): N/A
Flammability: LEL: No data UEL: No data
Special Fire Fighting Procedures: Use NIOSH/MSHA approved self-contained breathing apparatus and full protective clothing if involved in fire.
Fire Extinguishing agents Recommended: No specific agents recommended.
Extinguishing Media: N/A
Unusual Fire and Explosion Hazards: N/A

V HEALTH HAZARD INFORMATION
Primary Routes of Entry: Inhalation
Carcinogenicity: IARC classifies arsenic and certain arsenic compounds as Group 1 carcinogens (carcinogenic to humans). NTP classifies these materials as "..substances, and technological or manufacturing processes that are known to be carcinogenic." OSHA classifies inorganic arsenic and its compounds as carcinogens.
Acute Overexposure (symptoms and effects): Chronic overexposure to arsenic compounds may cause skin and eye irritation, peripheral neuritis of the hands and feet, and a increased risk of lung and skin cancer. Symptoms of chronic toxicity include weight loss, nausea, diarrhea, weakness, loss of appetite and skin lesions.
Medical Conditions Possibly Aggravated: Diseases of the lung, liver, kidneys, and nervous systems.

EMERGENCY AND FIRST AID PROCEDURES:
SKIN AND EYES: Flush with plenty of water. If symptoms develop, consult a physician.
INHALATION: Remove from exposure; place individual under care of a physician.
INGESTION: Induce vomiting in conscious individual and call a physician.

VI REACTIVITY DATA
Stability: Stable
Incompatibility (Material to Avoid): Halogen gases, halides, halogenates, potassium nitrate or permanganate or peroxides may cause a violent reaction or explode.
Hazardous Decomposition Products: At temperatures above the melting point, metal oxide fumes may be evolved. Under reducing conditions (i.e. any strong acid or base plus an active metal) or in the presence of nascent hydrogen, highly toxic arsine gas may be evolved.
Hazardous Polymerization: Will not occur

Conditions to Avoid: Not applicable

VII SPILL OR LEAK PROCEDURES
Steps to Be Taken in Case Material Is Released or Spilled: Any method which keeps dust to a minimum is acceptable. Vacuuming is preferred for dust. Use approved respiratory protection if possibility of dust/fume exposure exists. Do not use compressed air for cleaning.
Waste Disposal Method: If hazardous under 40 CFR 261, Subparts B and C, material must be treated or disposed in a facility meeting the requirements of 40 CFR 264 or 265. If non-hazardous, material should be disposed in a facility meeting the requirements of 40 CFR 257.
RCRA Status of Unused Material: If discarded in unaltered form, material should be tested to determine if it must be classified as a hazardous waste for disposal purposes. Under specified circumstances, application can be made to the EPA Administrator to have a particular waste designated non-hazardous.
Regulated by DOT?: Arsenic is regulated as a Poison B Hazardous Material.

VIII SPECIAL PROTECTION INFORMATION
Respiratory Protection: Where airborne exposures may exceed OSHA/ACGIH permissible air concentrations, the minimum respiratory protection recommended is a negative pressure air purifying respirator with cartridges that are NIOSH/MSHA approved against dust, fumes and mists having a TWA less than 0.05 mg/m 3
Eye and Face: Safety glasses recommended where the possibility of getting dust particles in eyes exists.
Other Clothing and Equipment: Full protective clothing is recommended for exposures that exceed permissible air concentrations. All contaminated clothing should be removed before leaving plant premises.

IX SPECIAL PRECAUTIONS
Normal Handling: Use of approved respirators is required for applications where adequate ventilation cannot be provided. Activities which generate dust or fume should be avoided. When melted, the temperature should be kept as low as possible.
Personal Hygiene: Avoid inhalation or ingestion. Practice good housekeeping and personal hygiene procedures. No tobacco or food in the work area. Wash thoroughly before eating or smoking. Shower and change clothes at end of work shift. Do not wear contaminated clothing home. Do not blow dust off clothing with compressed air.
Engineering Controls: Local exhaust ventilation is recommended for dust and/or fume generating operations where airborne exposures may exceed permissible air concentrations.
Special Precautions/Procedures/Label Instructions: Where airborne arsenic exposures may exceed the OSHA action level and PEL, refer to the OSHA Arsenic Standard 29 CFR1910.1018.
Label signal word: DANGER
Prepared by: S. Dierks
Revised Date: June 1993

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: CADMIUM
FORMULA: CD
FORMULA WT: 112.40
CAS NO.: 07440-43-9
NIOSH/RTECS NO.: EU9800000
PRODUCT CODES: 1184,1182
EFFECTIVE: 09/10/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 3 SEVERE (CANCER CAUSING)
FLAMMABILITY - 0 NONE
REACTIVITY - 0 NONE
CONTACT - 0 NONE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

WARNING
HARMFUL IF SWALLOWED OR INHALED
NOTE: REPORTED AS CAUSING CANCER IN LABORATORY ANIMALS. EXERCISE DUE CARE. AVOID CONTACT WITH EYES, SKIN, CLOTHING. AVOID BREATHING DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
CADMIUM	90-100	07440-43-9

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3 - PHYSICAL DATA

BOILING POINT: 767 C (1413 F)
MELTING POINT: 321 C (610 F)
SPECIFIC GRAVITY: 8.64 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): 3.9
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: SOFT, BLUE-WHITE SOLID.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP: N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

UNUSUAL FIRE & EXPLOSION HAZARDS
CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE OR EXPLOSION.

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5 - HEALTH HAZARD DATA

THIS SUBSTANCE IS LISTED AS NTP ANTICIPATED HUMAN CARCINOGEN, IARC PROBABLE HUMAN CARCINOGEN (GROUPS 2A AND 2B). THE ACCEPTABLE CEILING CONCENTRATION (PEL) IS 0.6 MG/M3.

THRESHOLD LIMIT VALUE (TLV/TWA): 0.05 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 0.2 MG/M3 (PPM)

TOXICITY: LD50 (ORAL-RAT)(MG/KG) - 225
LD50 (IPR-RAT)(MG/KG) - 4
LD50 (SCU-RAT)(MG/KG) - 9

CARCINOGENICITY: NTP: YES IARC: YES Z LIST: NO OSHA REG: YES

EFFECTS OF OVEREXPOSURE
OVEREXPOSURE TO VAPORS MAY CAUSE IRRITATION OF MUCOUS MEMBRANES, DRYNESS OF MOUTH AND THROAT, HEADACHE, NAUSEA AND DIZZINESS.
INHALATION MAY BE HARMFUL OR FATAL.
CHRONIC EFFECTS OF CADMIUM COMPOUNDS FROM LOW LEVEL EXPOSURE IN THE AIR MAY CAUSE IRREVERSIBLE LUNG INJURY, KIDNEY DISEASE, AND OTHER ADVERSE EFFECTS.
DUST MAY IRRITATE EYES.

TARGET ORGANS
RESPIRATORY SYSTEM, KIDNEYS, BLOOD, PROSTATE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INGESTION, INHALATION

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING. IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: NONE DOCUMENTED

INCOMPATIBLES: STRONG OXIDIZING AGENTS, NITRATES, NITRIC ACID

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D006 (EP TOXIC WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. AT CONCENTRATIONS UP TO 1 PPM, A HIGH-EFFICIENCY PARTICULATE RESPIRATOR IS RECOMMENDED. ABOVE THIS LEVEL, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES, UNIFORM, APRON, RUBBER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. STORE IN SECURE POISON AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	CADMIUM
HAZARD CLASS	ORM-E
LABELS	NONE
REPORTABLE QUANTITY	1 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	POISONOUS SOLIDS, N.O.S. (CADMIUM)
HAZARD CLASS	6.1
UN/NA	UN2811
LABELS	POISON

MATERIAL SAFETY DATA SHEET (MSDS)
MATERIAL SAFETY DATA SHEET
EM SCIENCE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer.....: Preparation Date.: 10/29/96
EM SCIENCE
A Division of EM Industries **Information Phone Number.:** 856-423-6300
P.O. Box 70 **Hours:** Mon. to Fri. 8:30-5
480 Democrat Road **Chemtrec Emergency Number:** 800-424-9300
Gibbstown, N.J. 08027 **Hours:** 24 hrs a day

Catalog Number(s):
CX1579 CX1580

Product Name:
Chromium

Synonyms:
Chrome

Chemical Family:
Metal

Formula:
Cr

Molecular Weight.:
52.00

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS #	Appr %
Chromium	7440-47-3	100%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

DUST IRRITATING.
LABORATORY TESTS INDICATE MATERIAL MAY BE CARCINOGENIC.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

Appearance:. Silver-gray powder or granules

POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)

Symptoms of Exposure:
Exposure to chromium by inhalation, skin or eye contact causes irritation.

Medical Cond. Aggravated by Exposure:
Data not available.

Routes of Entry:
Inhalation, ingestion or skin contact.

Carcinogenicity:
Proven human carcinogenic substance. Cancer Hazard.
WARNING: This product contains a chemical(s) known to the State of California to cause cancer.

4. FIRST AID MEASURES

Emergency First Aid:
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.
Eyes: Immediately flush thoroughly with water for at least 15 minutes.
Skin: Wash thoroughly with soap and water.
Inhalation: Remove to fresh air; give artificial respiration if breathing has stopped.
Ingestion: If conscious, drink water and induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flash Point (F): N/A
Flammable Limits LEL (%): N/A
Flammable Limits UEL (%): N/A
Extinguishing Media:
Dry powder, sand, water fog
Fire Fighting Procedures:
Wear self-contained breathing apparatus.
Fire & Explosion Hazards:
Fine powder may ignite or explode in atmospheres of carbon dioxide.

6. ACCIDENTAL RELEASE MEASURES

Spill Response:
Evacuate the area of all unnecessary personnel. Wear suitable protective equipment listed under Exposure / Personal.Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Take up and containerize for proper disposal as described under Disposal. Comply with Federal, State, and local regulations on reporting releases. Refer to Regulatory Information for reportable quantity and other regulatory data.

7. HANDLING AND STORAGE

Handling & Storage:
Keep container closed. Store in a cool area away from ignition sources. Do not breathe dust. Do not get in eyes, on skin, or on clothing.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:

Ventilation, Respiratory Protection, Protective Clothing, Eye Protection:
Material should be handled or transferred in an approved fume hood or with adequate ventilation. Protective gloves (Natural rubber, Neoprene or equivalent) should be worn to prevent skin contact. Safety glasses with side shields must be worn at all times.
Work/Hygenic Practices:
Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.
EXPOSURE GUIDELINES
OSHA - PEL:

TWA STEL CL
Component PPM MG/M3 PPM MG/M3 PPM MG/M3 Skin

Chromium
1.0

ACGIH - TLV:

TWA STEL CL
Component PPM MG/M3 PPM MG/M3 PPM MG/M3 Skin

Chromium
0.5

If there are no exposure limit numbers listed in the Exposure Guidelines chart, this indicates that no OSHA or ACGIH exposure limts have been established.

9. PHYSICAL AND CHEMCIAL PROPERTIES

Boiling Point (C 760 mmHg) : 2642C
Melting Point (C) : 1900C
Specific Gravity ($H_2 0$ = 1) : 7.14
Vapor Pressure (mm Hg) : N/A

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1 - PRODUCT IDENTIFICATION

PRODUCT NAME: COPPER
FORMULA: CU
FORMULA WT: 63.55
CAS NO.: 07440-50-8
NIOSH/RTECS NO.: GL5325000
COMMON SYNONYMS: BRONZE POWDER; C.I. 77400; ARWOOD COPPER
PRODUCT CODES: 1732,1736,1720,1714,1728
EFFECTIVE: 06/25/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	1	SLIGHT

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

CAUTION
MAY CAUSE IRRITATION
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
COPPER	90-100	07440-50-8

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3 - PHYSICAL DATA

BOILING POINT: 2595 C (4703 F)
MELTING POINT: 1083 C (1981 F)
SPECIFIC GRAVITY: 8.92 (H2O=1)
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: REDDISH, LUSTROUS, MALLEABLE METAL.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

TOXIC GASES PRODUCED
COPPER FUMES

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5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 1.0 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
DUST MAY CAUSE SNEEZING AND COUGHING.
DUST MAY IRRITATE SKIN OR EYES.
PROLONGED EXPOSURE MAY CAUSE DERMATITIS.
INGESTION MAY CAUSE NAUSEA, VOMITING, HEADACHES, DIZZINESS, GASTROINTESTINAL IRRITATION.
NOTE: PRODUCT IS A SOLID MASS; HOWEVER, WARNINGS ARE BASED ON INHALATION DUST, MIST OR FUME EMISSIONS THAT ARE POSSIBLE DURING MANUFACTURING OR CHEMICAL REACTIONS.

TARGET ORGANS
NONE IDENTIFIED

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
NONE INDICATED

EMERGENCY AND FIRST AID PROCEDURES
INGESTION: IF SWALLOWED AND THE PERSON IS CONSCIOUS, IMMEDIATELY GIVE LARGE AMOUNTS OF WATER. GET MEDICAL ATTENTION.
INHALATION: IF A PERSON BREATHES IN LARGE AMOUNTS, MOVE THE EXPOSED PERSON TO FRESH AIR. GET MEDICAL ATTENTION.
EYE CONTACT: IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
SKIN CONTACT: IMMEDIATELY WASH WITH PLENTY OF SOAP AND WATER FOR AT LEAST

15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: MOISTURE

INCOMPATIBLES: STRONG ACIDS, ACTIVE HALOGEN COMPOUNDS, CHLORINE, FLUORINE, IODINE, BROMINE, AMMONIA

DECOMPOSITION PRODUCTS: COPPER FUMES

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SUITABLE PROTECTIVE CLOTHING. CAREFULLY SWEEP UP AND REMOVE.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

---

8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A DUST/MIST RESPIRATOR IS RECOMMENDED. IF CONCENTRATION EXCEEDS CAPACITY OF RESPIRATOR, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, PROPER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	COPPER, HEAVY FOIL
HAZARD CLASS	ORM-E
LABELS	NONE
REPORTABLE QUANTITY	5000 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	CHEMICALS, N.O.S. (NON-REGULATED)

---

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: LEAD, GRANULAR OR SHOT
FORMULA: PB
FORMULA WT: 207.19
CAS NO.: 7439-92-1
NIOSH/RTECS NO.: OF7525000
COMMON SYNONYMS: C.I. 77575
PRODUCT CODES: 4996,2256,2266
EFFECTIVE: 11/25/86
REVISION #02

PRECAUTIONARY LABELLING

BAKER SAF-T-DATA(TM) SYSTEM

HEALTH	-	0	NONE
FLAMMABILITY	-	0	NONE
REACTIVITY	-	0	NONE
CONTACT	-	0	NONE

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

SAFETY GLASSES; LAB COAT

PRECAUTIONARY LABEL STATEMENTS

WARNING
MAY BE FATAL IF SWALLOWED
DURING USE AVOID CONTACT WITH EYES, SKIN, CLOTHING. WASH THOROUGHLY AFTER HANDLING. WHEN NOT IN USE KEEP IN TIGHTLY CLOSED CONTAINER.

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
INORGANIC LEAD	87-99	7439-92-1
ANTIMONY	0.5-5	7440-36-0
INORGANIC ARSENIC	.01-.5	7440-38-2

---

3 - PHYSICAL DATA

BOILING POINT: 1744 C (3171 F)
MELTING POINT: 327 C (621 F)
SPECIFIC GRAVITY: 11.34
VAPOR PRESSURE(MM HG): N/A
VAPOR DENSITY(AIR=1): N/A
EVAPORATION RATE: N/A

(H2O=1) (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 0

APPEARANCE & ODOR: GRAYISH-WHITE, SILVERY METAL, WITH NO ODOR.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

TOXIC GASES PRODUCED
LEAD FUMES

---

5 - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE (TLV/TWA): 0.15 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 0.05 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: YES OSHA REG: YES

EFFECTS OF OVEREXPOSURE
INGESTION MAY CAUSE LASSITUDE, WEIGHT LOSS, CONSTIPATION, AND ANEMIA.
INGESTION MAY CAUSE NAUSEA, VOMITING, PARALYSIS, AND CENTRAL NERVOUS SYSTEM
INGESTION IS HARMFUL AND MAY BE FATAL.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.
IRREVERSIBLE INJURY TO BLOOD FORMING TISSUE MAY RESULT FROM CHRONIC LOW LEVEL EXPOSURE.
NOTE: PRODUCT IS A SOLID MASS; HOWEVER, WARNINGS ARE BASED ON INHALATION DUST, MIST OR FUME EMISSIONS THAT ARE POSSIBLE DURING MANUFACTURING OR CHEMICAL REACTIONS.

TARGET ORGANS
GI TRACT, CENTRAL NERVOUS SYSTEM, KIDNEYS, BLOOD, GINGIVAL TISSUE

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY

INGESTION, INHALATION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.
IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED IN LARGE AMOUNTS, MOVE EXPOSED PERSON TO FRESH AIR.
GET MEDICAL ATTENTION.
IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES. GET MEDICAL ATTENTION.
IN CASE OF CONTACT, IMMEDIATELY WASH SKIN WITH PLENTY OF SOAP AND WATER FOR AT LEAST 15 MINUTES.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

INCOMPATIBLES: STRONG OXIDIZING AGENTS, POTASSIUM METAL, SODIUM METAL

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7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
WITH CLEAN SHOVEL, CAREFULLY PLACE MATERIAL INTO CLEAN, DRY CONTAINER AND COVER; REMOVE FROM AREA. FLUSH SPILL AREA WITH WATER.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: D008 (EP TOXIC WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE ADEQUATE VENTILATION CONDITIONS EXIST. IF AIRBORNE CONCENTRATION EXCEEDS TLV, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GLASSES WITH SIDESHIELDS, UNIFORM, PROPER GLOVES ARE RECOMMENDED.

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9 - STORAGE AND HANDLING PRECAUTIONS

SAF-T-DATA(TM) STORAGE COLOR CODE: ORANGE (GENERAL STORAGE)

SPECIAL PRECAUTIONS
KEEP CONTAINER TIGHTLY CLOSED. SUITABLE FOR ANY GENERAL CHEMICAL STORAGE AREA.

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10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION

DOMESTIC (D.O.T.)

PROPER SHIPPING NAME	LEAD
HAZARD CLASS	ORM-E
LABELS	NONE
REPORTABLE QUANTITY	1 LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME	CHEMICALS, N.O.S. (NON-REGULATED)

---

1 - PRODUCT IDENTIFICATION

PRODUCT NAME: MERCURY (METAL)
FORMULA: HG
FORMULA WT: 200.59
CAS NO.: 07439-97-6
NIOSH/RTECS NO.: OV4550000
COMMON SYNONYMS: QUICKSILVER; LIQUID SILVER
PRODUCT CODES: 2569,2567,2564,2572
EFFECTIVE: 09/05/86
REVISION #02

PRECAUTIONARY LABELLING
BAKER SAF-T-DATA(TM) SYSTEM

HEALTH - 4 EXTREME (POISON)
FLAMMABILITY - 0 NONE
REACTIVITY - 1 SLIGHT
CONTACT - 3 SEVERE (LIFE)

HAZARD RATINGS ARE 0 TO 4 (0 = NO HAZARD; 4 = EXTREME HAZARD).

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES

PRECAUTIONARY LABEL STATEMENTS

POISON DANGER
EXCEPTIONAL CONTACT HAZARD - READ MATERIAL SAFETY DATA SHEET
MAY BE FATAL IF SWALLOWED OR INHALED
EMITS TOXIC VAPORS, ESPECIALLY WHEN HEATED.
DO NOT GET IN EYES, ON SKIN, ON CLOTHING.
DO NOT BREATHE DUST. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING.

SAF-T-DATA(TM) STORAGE COLOR CODE: BLUE (HEALTH)

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2 - HAZARDOUS COMPONENTS

COMPONENT	%	CAS NO.
MERCURY (METAL)	90-100	7439-97-6

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3 - PHYSICAL DATA

BOILING POINT: 357 C (675 F)
VAPOR PRESSURE(MM HG): .002

MELTING POINT: -39 C (-38 F)
VAPOR DENSITY(AIR=1): 1.01

SPECIFIC GRAVITY: 13.53 (H2O=1) EVAPORATION RATE: 4 (BUTYL ACETATE=1)

SOLUBILITY(H2O): NEGLIGIBLE (LESS THAN 0.1 %) % VOLATILES BY VOLUME: 100

APPEARANCE & ODOR: SILVER-WHITE, HEAVY, MOBILE LIQUID METAL.

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4 - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (CLOSED CUP N/A

FLAMMABLE LIMITS: UPPER - N/A % LOWER - N/A %

FIRE EXTINGUISHING MEDIA
USE EXTINGUISHING MEDIA APPROPRIATE FOR SURROUNDING FIRE.

SPECIAL FIRE-FIGHTING PROCEDURES
FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE.

---

5 - HEALTH HAZARD DATA

TLV LISTED DENOTES (TLV-SKIN).

THRESHOLD LIMIT VALUE (TLV/TWA): 0.05 MG/M3 (PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 0.1 MG/M3 (PPM)

CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO

EFFECTS OF OVEREXPOSURE
INHALATION OF VAPORS MAY CAUSE COUGHING, CHEST PAINS, NAUSEA AND VOMITING.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE KIDNEY AND/OR LIVER DAMAGE.
CHRONIC EFFECTS OF OVEREXPOSURE MAY INCLUDE CENTRAL NERVOUS SYSTEM DEPRESSION.
CHRONIC EFFECTS OF MERCURY POISONING INCLUDE A BUILDUP OF THE METAL IN THE BRAIN, LIVER AND KIDNEYS. SYMPTOMS INCLUDE HEADACHE, TREMORS, LOOSE TEETH, LOSS OF APPETITE, BLISTERS ON THE SKIN AND IMPAIRED MEMORY.

TARGET ORGANS
EYES, SKIN, RESPIRATORY SYSTEM, CENTRAL NERVOUS SYSTEM, KIDNEYS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE
NONE IDENTIFIED

ROUTES OF ENTRY
INHALATION, ABSORPTION, EYE CONTACT, SKIN CONTACT

EMERGENCY AND FIRST AID PROCEDURES
CALL A PHYSICIAN.

IF SWALLOWED, IF CONSCIOUS, IMMEDIATELY INDUCE VOMITING.
IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN.
IN CASE OF CONTACT, IMMEDIATELY FLUSH EYES OR SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES.
WASH CLOTHING BEFORE RE-USE.

PEL LISTED DENOTES CEILING LIMIT.

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6 - REACTIVITY DATA

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT

INCOMPATIBLES: STRONG ACIDS

---

7 - SPILL AND DISPOSAL PROCEDURES

STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE
WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING.
CLEAN UP SPILL IMMEDIATELY. COLLECT AND STORE USING A SUCTION PUMP WITH A CAPILLARY TUBE. CALCIUM POLYSULFIDE WITH EXCESS SULFUR SHOULD BE SPRINKLED INTO CRACKS OR INACCESSIBLE SITES. KEEP COLLECTED MERCURY IN A TIGHTLY CLOSED BOTTLE FOR RECOVERY OR DISPOSAL.

J.T. BAKER CINNASORB(R) AND RESISORB(R) ARE RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE
DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U151 (TOXIC WASTE)

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8 - PROTECTIVE EQUIPMENT

VENTILATION: USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: NONE REQUIRED WHERE APPROPRIATE VENTILATION CONDITIONS EXIST. IF THE TLV IS EXCEEDED, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

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   9 - STORAGE AND HANDLING PRECAUTIONS
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SAF-T-DATA(TM) STORAGE COLOR CODE:     BLUE (HEALTH)

SPECIAL PRECAUTIONS
  KEEP CONTAINER TIGHTLY CLOSED.  STORE IN SECURE POISON AREA.

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  10 - TRANSPORTATION DATA AND ADDITIONAL INFORMATION
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DOMESTIC (D.O.T.)

PROPER SHIPPING NAME     MERCURY, METALLIC (AIR ONLY)
HAZARD CLASS             ORM-B
UN/NA                    NA2809
LABELS                   NONE
REPORTABLE QUANTITY      1    LBS.

INTERNATIONAL (I.M.O.)

PROPER SHIPPING NAME     MERCURY, METAL
HAZARD CLASS             8
UN/NA                    UN2809
LABELS                   CORROSIVE
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MATERIAL SAFETY DATA SHEET (MSDS)
MATERIAL SAFETY DATA SHEET
EM SCIENCE

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Manufacturer.....: Preparation Date.: 3/1/91
EM SCIENCE
A Division of EM Industries **Information Phone Number.:** 856-423-6300
P.O. Box 70 **Hours:** Mon. to Fri. 8:30-5
480 Democrat Road **Chemtrec Emergency Number:** 800-424-9300
Gibbstown, N.J. 08027 **Hours:** 24 hrs a day

Catalog Number(s):
ZX0010 ZX0011 ZX0017 ZX0020 ZX0033 ZX0035 ZX0040
ZX0045

Product Name:
Zinc

Synonyms:
Granular Zinc

Chemical Family:
Metal

Formula:
Zn

Molecular Weight.:
65.39

2. COMPOSITION / INFORMATION ON INGREDIENTS

Component	CAS #	Appr %
Zinc	7440-66-6	100%

3. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW
Avoid Generation Of Zinc Dust.
MAY BE HARMFUL IF INHALED OR SWALLOWED.

Appearance:
Gray, odorless, granular, sticks, strips, sheets.**POTENTIAL HEALTH EFFECTS (ACUTE AND CHRONIC)**

Symptoms of Exposure:
May be harmful if inhaled (dust) or swallowed. Irritating to skin on contact; dust may irritate respiratory tract. Inhalation may cause sweet taste, dry throat, cough, weakness, aching, chills, fever, nausea and vomiting. Fumes may cause metal fume fever. Ingestion may cause severe gastroenteritis.

Medical Cond. Aggravated by Exposure:
Data not available.

Routes of Entry:
Inhalation, ingestion

Carcinogenicity:

The material is not listed (IARC, NTP, OSHA) as cancer causing agent.

4. FIRST AID MEASURES

Emergency First Aid:
GET MEDICAL ASSISTANCE FOR ALL CASES OF OVEREXPOSURE.
Skin: Wash thoroughly with soap and water.
Eyes: Immediately flush thoroughly with water for at least 15 minutes.
Inhalation: Remove to fresh air; give artificial respiration if breathing has stopped.
Ingestion: If conscious, drink water and induce vomiting immediately as directed by medical personnel. Never give anything by mouth to an unconscious person.

5. FIRE FIGHTING MEASURES

Flash Point (F): Flammable (dust)
Flammable Limits LEL (%): N/A
Flammable Limits UEL (%): N/A
Extinguishing Media:
Smother with sand or otherwise cut off oxygen supply
Use special dry chemical; do not use CO2
Fire Fighting Procedures:
Wear self-contained breathing apparatus.
Fire & Explosion Hazards:
Dust forms explosive and flammable mixtures with air; especially when damp.

6. ACCIDENTAL RELEASE MEASURES

Spill Response:. Evacuate the area of all unnecessary personnel. Wear suitable protective equipment listed under Exposure / Personal Protection. Eliminate any ignition sources until the area is determined to be free from explosion or fire hazards. Contain the release and eliminate its source, if this can be done without risk. Take up and containerize for proper disposal as described under Disposal. Comply with Federal, State, and local regulations on reporting releases. Refer to Regulatory Information for reportable quantity and other regulatory data.

7. HANDLING AND STORAGE

Handling & Storage:
Keep container closed. Store in a cool area away from ignition sources and oxidizers. Generation of dust from application to granular, stick, sheet or strip form causes fire and explosion hazard. Do not breathe dust. Do not get in eyes, on skin, or on clothing.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION ENGINEERING CONTROLS AND PERSONAL PROTECTIVE EQUIPMENT:

Ventilation, Respiratory Protection, Protective Clothing, Eye Protection:
Material should be handled or transferred in an approved fume hood or with adequate ventilation. Protective gloves should be worn to prevent skin contact (Neoprene or equivalent) Safety glasses with side shields should be worn at all times. Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other

NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Work/Hygenic Practices:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

EXPOSURE GUIDELINES

OSHA - PEL:

Component	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	Skin
Zinc							

ACGIH - TLV:

Component	PPM	MG/M3	PPM	MG/M3	PPM	MG/M3	Skin
Zinc							

If there are no exposure limit numbers listed in the Exposure Guidelines chart, this indicates that no OSHA or ACGIH exposure limts have been established.

9. PHYSICAL AND CHEMCIAL PROPERTIES.Boiling Point (C 760 mmHg) : 907C
Melting Point (C) : 419C
Specific Gravity ($H_2 0$ = 1) : 7.14
Vapor Pressure (mm Hg) : 1 487C
Percent Volatile by vol (%): N/A
Vapor Density (Air = 1) : N/A
Evaporation Rate (BuAc = 1): N/A
Solubility in Water (%) : Insoluble
Appearance :
Gray, odorless, granular, sticks, strips, sheets

10. STABILITY AND REACTIVITY

Stability: Yes
Hazardous Polymerization:
Does not occur
Hazardous Decomposition:
Explosive hydrogen gas, zinc oxide
Conditions to Avoid:
Heat, open flame, moisture. Generation of dust from any application done to granular, stick, strip or sheet form.
Materials To Avoid:

(X) Water
(X) Acids
( ) Bases
( ) Corrosives
(X) Oxidizers
(X) Other: Halogenated hydrocarbons, Strong alkalies, Alkali hydroxides

11. TOXICOLOGICAL INFORMATION

Toxicity Data

ihl-hmn TCLo: 124/mg/cu.m./50M
(toxic effect on respiratory and pulmonary systems)

Toxicological Findings:

None
Cited in Registry of Toxic Effects of Chemical Substances (RTECS)

12. DISPOSAL CONSIDERATIONS

EPA Waste Numbers:.Treatment:

Material does not have an EPA Waste number and is not a listed waste, however consultation with a permitted waste disposal site (TSD) should be accomplished.
ALWAYS CONTACT A PERMITTED WASTE DISPOSER (TSD) TO ASSURE COMPLIANCE WITH ALL CURRENT LOCAL, STATE AND FEDERAL REGULATIONS.

13. TRANSPORT INFORMATION

DOT Proper Shipping Name:

non-regulated

DOT ID Number :

none

14. REGULATORY INFORMATION

TSCA Statement:

The CAS number of this product is listed on the TSCA Inventory.

SARA SARA CERCLA
Component EHS EHS TPQ RQ
(302) (lbs) (lbs)

Zinc
1000
OSHA SARA DeMinimis
Component Floor List 313 for SARA 313
(%)

Zinc
Y 1.0

If there is no information listed on the regulatory information chart, this indicates that the chemical is not covered by the specific regulation listed.

15. OTHER INFORMATION

Comments:

None

NFPA Hazard Ratings:

Health : 0
Flammability : 1
Reactivity : 0
Special Hazards :.**Revision History:** 12/1/81 5/1/84 10/27/87 3/30/88
| = Revised Section
N/A = Not Available

N/E = None Establised

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APPENDIX D

SPI Results

Station/ Rep		Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
1A	B	15S	35.7	1.5	34.2	7622521.7	732989.6	12/06/01	14:51:21	258	13.95	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
1B	A	15S	46.3	1.5	44.8	7622543.3	732951.6	12/06/01	14:44:48	250	14.02	52.25	3.73	3.25	4.12	0.87	52.25	>3.73	Yes	>3.25	>4.12	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
1C	A	15S	53.3	1.6	51.7	7622804.5	732661.4	12/06/01	14:38:43	244	14.02	117.09	8.35	7.92	8.37	0.45	51.43	3.67	No	2.25	4.32	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
1D	B	5S	51.5	1.6	49.9	7623154.2	732258.4	12/06/01	14:33:15	239	13.97	91.12	6.52	6.22	6.75	0.52	52.21	3.74	No	3.15	3.95	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
1E	B	15S	15.6	1.6	14.0	7623362.8	731983.1	12/06/01	14:25:19	234	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
1F	A	15S	17.0	1.6	15.4	7623428.1	731919.0	12/06/01	14:19:32	228	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
2A	C	15S	15.7	1.8	13.9	7622002.5	731882.7	12/06/01	13:36:05	190	14.02	101.48	7.24	6.95	7.55	0.60	60.75	4.33	No	3.15	5.40	4-3	1	>4	1	5.32	5.50	0	0.00	0.00	0.00	1 on 3
2B	A	15S	33.5	1.8	31.7	7622112.2	731814.7	12/06/01	13:39:11	192	14.02	80.98	5.78	3.95	6.95	3.00	Ind	Ind	No	Ind	Ind	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
2C	A	15S	53.8	1.7	52.1	7622314.4	731689.4	12/06/01	13:51:16	204	14.02	71.56	5.10	4.92	5.40	0.47	28.55	2.04	No	1.18	2.35	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
2D	C	15S	58.9	1.7	57.2	7622626.8	731529.8	12/06/01	13:58:46	214	13.97	101.15	7.24	6.72	7.60	0.87	54.58	3.91	No	2.60	5.47	4-3	1	>4	2	1.65	6.32	0	0.00	0.00	0.00	2 on 3
2E	A	15S	29.1	1.7	27.4	7622893.6	731374.3	12/06/01	14:05:34	216	13.97	136.05	9.74	9.10	10.10	1.00	136.05	>9.74	Yes	>9.10	>10.10	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
2F	C	5S	13.4	1.7	11.7	7622924.1	731351.6	12/06/01	14:12:00	225	14.00	100.65	7.19	6.87	7.45	0.57	47.93	3.42	No	2.87	4.12	4-3	1	>4	1	1.05	1.48	0	0.00	0.00	0.00	2 on 3
3A	A	15S	15.9	1.8	14.1	7621532.9	731030.9	12/06/01	13:26:42	180	13.95	107.20	7.69	7.42	7.90	0.47	31.97	2.29	No	1.93	2.68	4-3/>4	1	>4	2	1.47	7.11	0	0.00	0.00	0.00	1 on 3
3B	C	15S	44.2	1.8	42.4	7621688.8	730961.9	12/06/01	13:23:33	178	14.00	94.68	6.76	6.47	6.95	0.47	94.68	>6.76	Yes	>6.47	>6.95	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
3C	C	5S	55.9	1.8	54.1	7622033.1	730761.5	12/06/01	13:16:14	171	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
3D	A	15S	52.1	1.9	50.2	7622293.0	730608.9	12/06/01	13:03:58	158	14.02	64.66	4.61	4.07	4.92	0.85	54.91	3.92	No	2.93	4.45	>4	2	>4	5	1.32	4.50	0	0.00	0.00	0.00	2 on 3
3E	B	15S	27.4	1.9	25.5	7622425.5	730534.4	12/06/01	12:58:09	154	14.00	119.59	8.54	7.85	9.00	1.15	30.22	2.16	No	1.45	3.20	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
3F	A	15S	12.3	1.9	10.4	7622458.5	730510.1	12/06/01	12:49:29	146	14.00	121.11	8.65	8.35	8.92	0.57	121.11	>8.65	Yes	>8.35	>8.92	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
4A	A	15S	11.5	2.0	9.5	7621037.3	730285.1	12/06/01	11:50:35	118	14.00	172.33	12.31	12.02	12.45	0.42	67.73	4.84	No	3.35	6.05	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
4B	B	15S	32.8	2.0	30.8	7621120.7	730225.9	12/06/01	12:24:20	126	13.97	115.19	8.25	7.75	8.67	0.92	62.57	4.48	No	3.28	5.57	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
4C	A	15S	49.7	2.0	47.7	7621338.7	730075.0	12/06/01	12:29:20	130	14.02	81.77	5.83	5.60	6.07	0.47	81.77	>5.83	Yes	>5.60	>6.07	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2 on 3
4D	B	15S	53.6	2.0	51.6	7621626.2	729865.1	12/06/01	12:35:15	136	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
4E	C	15S	28.8	1.9	26.9	7621930.7	729634.8	12/06/01	12:43:47	144	13.97	155.92	11.16	10.15	12.17	2.02	41.24	2.95	No	2.67	4.51	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1 -> 2
5A	B	15S	12.8	2.0	10.8	7620442.1	729493.9	12/06/01	11:44:39	114	13.97	133.92	9.59	8.70	10.80	2.10	19.06	1.36	No	1.00	2.00	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
5B	A	15S	24.7	2.0	22.7	7620468.9	729488.0	12/06/01	11:38:22	106	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
5B	F	15S	25.4	0.6	24.8	7620472.8	729472.3	12/10/01	9:00:17	752	13.97	249.01	17.82	17.54	18.54	1.00	85.73	6.14	No	5.00	9.45	>4-3	1	>4	2	12.40	13.57	0	0.00	0.00	0.00	1 on 3
5C	B	15S	58.4	2.1	56.3	7620889.8	729167.5	12/06/01	11:32:40	102	13.97	1.77	0.13	0.00	0.53	0.53	Ind	Ind	No	Ind	Ind	4-3	2	>4	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
5C	D	15S	55.7	0.6	55.1	7620888.5	729166.0	12/10/01	8:53:47	744	14.00	16.98	1.21	1.02	1.42	0.40	16.98	>1.21	Yes	>1.02	>1.42	4-3	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
5D	A	15S	56.1	2.1	54.0	7621340.4	728794.6	12/06/01	11:24:29	94	14.00	180.16	12.87	12.47	13.10	0.62	25.37	1.81	No	1.32	1.98	4-3	1	>4	1	2.10	2.43	6	1.16	9.80	12.87	1 on 3
5D	C	15S	56.0	2.1	53.9	7621340.9	728795.2	12/06/01	11:26:14	98	13.97	164.60	11.78	11.20	12.12	0.92	15.71	1.12	No	0.36	1.65	4-3/>4	1	>4	1	4.47	4.77	0	0.00	0.00	0.00	1 on 3
5E	D	15S	29.1	2.1	27.0	7621472.0	728695.5	12/06/01	11:21:18	92	13.95	13.70	0.98	0.47	1.65	1.17	Ind	Ind	No	0.13	0.53	>4	3	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
5E	E	15S	27.2	0.6	26.6	7621466.5	728707.5	12/10/01	8:45:41	738	14.02	39.06	2.79	2.32	3.90	1.57	17.76	1.27	No	0.85	1.60	4-3/>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
6A	A	15S	10.7	2.0	8.7	7619852.0	728910.7	12/06/01	10:28:20	52	13.97	0.00	0.00	0.00	0.00	0.00	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
6B	A	15S	36.3	2.0	34.3	7619915.6	728861.3	12/06/01	10:40:43	62	14.00	163.21	11.66	10.22	12.90	2.67	41.31	2.95	No	0.61	5.15	>4	2	>4	1	7.00	7.27	0	0.00	0.00	0.00	1 on 3
6C	A	15S	52.6	2.0	50.6	7620066.7	728663.7	12/06/01	10:47:17	68	14.02	68.75	4.90	4.55	5.40	0.85	68.75	>4.90	Yes	>4.55	>5.40	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2 on 3
6C	D	15S	51.3	0.6	50.7	7620068.5	728662.1	12/10/01	9:06:17	756	14.00	94.30	6.74	6.37	6.95	0.57	71.79	5.13	No	3.85	6.02	4-3/>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
6D	A	15S	62.3	2.0	60.3	7620216.3	728463.3	12/06/01	10:54:40	74	14.00	182.76	13.06	11.70	13.95	2.25	27.79	1.99	No	0.70	4.22	>4-3	2	>4	3	5.00	10.10	0	0.00	0.00	0.00	1 on 3
6E	B	15S	17.6	2.1	15.5	7620604.1	727953.6	12/06/01	11:03:22	82	13.97	5.29	0.38	0.00	1.02	1.02	Ind	Ind	No	Ind	Ind	>4	3	>4	Ind	Ind	Ind	Ind	Ind	0.00	0.00	Ind
6E	D	15S	18.9	0.5	18.4	7620605.1	727952.4	12/10/01	9:11:53	762	14.00	15.46	1.10	0.63	2.00	1.37	15.46	>1.10	Yes	>0.63	>2.00	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
7A	C	15S	14.4	1.9	12.5	7619070.0	728372.3	12/06/01	10:22:14	50	13.97	168.91	12.09	11.30	12.32	1.02	19.52	1.40	No	0.76	2.15	>4	2	>4	0	0.00	0.00	16	2.52	5.90	13.06	1
7B	B	15S	30.3	1.9	28.4	7619130.8	728294.3	12/06/01	10:15:17	42	13.97	161.42	11.55	10.87	12.40	1.52	26.59	1.90	No	0.84	3.35	>4	2	>4	5	4.40	9.62	0	0.00	0.00	0.00	1 on 3
7C	A	15S	61.4	1.8	59.6	7619443.8	727879.4	12/06/01	10:02:48	34	13.95	176.87	12.68	12.55	12.95	0.40	31.62	2.27	No	1.80	2.92	>4	2	>4	2	9.45	10.17	0	0.00	0.00	0.00	3
7D	A	15S	50.9	1.7	49.2	7619728.7	727502.2	12/06/01	9:56:33	28	14.02	228.81	16.32	15.95	16.59	0.65	76.35	5.45	No	4.10	6.90	>4	1	>4	5	10.35	15.22	0	0.00	0.00	0.00	1 on 3
7E	A	15S	10.6	1.6	9.0	7619853.5	727336.8	12/06/01	9:45:55	22	13.95	99.34	7.12	6.23	7.55	1.32	99.34	>7.12	Yes	>6.23	>7.55	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
8A	A	5S	14.6	1.0	13.6	7618231.6	727874.6	12/05/01	17:00:06	2761	14.02	80.83	5.76	5.52	6.37	0.85	80.83	>5.76	Yes	>5.52	>6.37	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
8B	A	5S	27.8	1.0	26.8	7618306.4	727774.0	12/05/01	16:50:24	2747	14.02	190.54	13.59	12.82	14.15	1.33	21.36	1.52	No	0.93	2.30	>4	2	>4	3	4.42	8.42	0	0.00	0.00	0.00	1 on 3
8C	C	15S	48.7	1.0	47.7	7618483.4	727532.1	12/05/01	16:45:53	2744	14.02	199.70	14.24	14.02	14.57	0.55	18.72	1.34	No	0.70	1.60	>4	2	>4	2	2.17	8.00	0	0.00	0.00	0.00	1 on 3
8D	C	15S	58.2	1.0	57.2	7618638.4	727305.2	12/05/01	16:39:47	2736	14.00	158.68	11.34	11.20	11.37	0.18	34.20	2.44	No	1.35	3.62	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
8E	C	5S	24.5	1.0	23.5	7619020.3	726757.9	12/05/01	16:33:28	2729	13.97	190.27	13.62	13.35	13.90	0.55	82.37	5.90	No	4.00	7.17	>4	2	>4	1	8.65	9.05	0	0.00	0.00	0.00	1 on 3
8F	C	5S	14.0	1.1	12.9	7619066.5	726679.8	12/05/01	16:25:03	2723	13.97	99.52	7.12	6.30	7.75	1.45	79.72	5.71	No	2.98	7.02	>4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
9A	A	15S	16.5	1.2	15.3	7617366.7	727319.6	12/05/01	15:20:25	2650	14.05	178.99	12.74	12.00	13.10	1.10	28.09	2.00	No	1.32	2.47	>4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
9B	A	15S	26.2	1.2	25.0	7617436.0	727227.0	12/05/01	15:26:57	2656	14.02	218.55	15.59	15.27	15.77	0.50	40.56	2.89	No	1.55	2.92	>4	2	>4	1	14.07	14.47	0	0.00	0.00	0.00	1 on 3
9C	A	15S	30.7	1.2	29.5	7617554.9	727077.2	12/05/01	15:33:23	2664	14.05	216.78	15.43	13.35	16.57	3.22	41.92	2.98	No	2.57	3.57	>4	2	>4	1	9.62	10.02	0	0.00	0.00	0.00	1 on 3
9D	C	15S	55.0	1.2	53.8	7617836.7	726716.0	12/05/01	15:41:41	2674	14.00	23.07	1.65	1.57	1.80	0.22	10.06	0.72	No	0.50	0.98	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
9E	A	15S	47.8	0.7	47.1	7618183.6	726261.5	12/10/01	8:27:02	726	14.02	240.81	17.18	15.87	18.19	2.32	168.21	12.00	No	10.77	13.80	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
9F	B	15S	14.1	0.7	13.4	7618424.2	725942.3	12/10/01	8:33:59	734	13.95	116.16	8.33	7.50	8.75	1.25	81.26	5.83	No	3.93	7.85	>4	2	>4	1	6.07	6.32	0	0.00	0.00	0.00	1 on 3
10A	B	15S	10.6	1.2	9.4	7616434.2	726519.4	12/05/01	15:11:26	2646	14.00	88.03	6.29	6.00	6.57	0.57	33.69	2.41	No	1.55	3.90	>4/4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
10B	A	15S	23.9	1.3	22.6	7616516.6	726451.6	12/05/01	15:05:23	2636	14.02	239.51	17.08	15.87	17.92	2.05	45.85	3.27	No	2.40	3.70	>4	2	>4	3	2.27	12.62	1	0.25	15.85	16.49	1 on 3
10C	C	15S	51.1	1.3	49.8	7617049.6	726080.4	12/05/01	15:01:46	2634	14.02	158.27	11.29	11.20	11.37	0.18	40.61	2.90	No	2.07	3.72	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
10D	B	5S	53.7	1.3	52.4	7617498.6	725736.8	12/05/01	14:55:35	2625	14.02	297.94	>21.25	>21.25	>21.25	Ind	133.17	>9.50	No	>8.15	>10.67	>4	2	>4	2	13.50	16.50	11	0.93	0.00	0.00	3
10D	E	15S	51.8	0.7	51.1	7617508.2	725736.8	12/10/01	8:21:12	722	13.97	245.12	17.55	17.32	17.92	0.60	245.12	>17.55	Yes	>17.32	>17.92	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
10E	A	15S	30.9	1.3	29.6	7617922.4	725417.2	12/05/01	14:47:52	2618	14.02	252.81	18.03	17.52	18.14	0.62	74.26	5.30	No	3.65	8.85	>4	2	>4	2	8.20	11.67	13	2.69	14.47	18.03	1 on 3
10F	B	15S	12.3	1.3	11.0	7618004.4	725358.8	12/05/01	14:43:51	2614	14.00	70.68	5.05	4.45	5.40	0.95	70.68	>5.05	Yes	>4.45	>5.40	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
11A	B	15S	13.4	1.6	11.8	7615930.7	725700.5	12/05/01	13:24:23	2568	14.00	204.95	14.64	13.42	15.77	2.35	75.64	5.40	No	4.80	7.25	>4	2	>4	1	12.95	13.75	0	0.00	0.00	0.00	1 on 3
11B	A	15S	27.0	1.5	25.5	7616085.6	725569.0	12/05/01	13:41:14	2578	14.02	270.66	19.30	18.19	20.29	2.10	111.33	7.94	No	6.97	8.67	>4	2	>4	6	3.12	15.15	0	0.00	0.00	0.00	1 on 3
11C	A	15S	51.7	1.4	50.3	7616389.8	725360.0	12/05/01	14:13:05	2586	13.97	262.99	18.82	18.44	19.04	0.60	58.81	4.21	No	3.25	6.12	>4	1	>4	3	5.10	18.29	0	0.00	0.00	0.00	1 on 3
11D	C	15S	54.2	1.4	52.8	7616705.4	725131.9	12/05/01	14:20:48	2596	14.02	104.79	7.47	7.30	7.62	0.32	61.18	4.36	No	3.62	5.42	>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
11E	A	15S	62.7	1.4	61.3	7617350.5	724625.3	12/05/01	14:29:06	2598	14.02	280.20	19.98	19.42	20.22	0.80	88.27	6.30	No	5.57	6.85	>4	2	>4	4	10.00	19.00	0	0.00	0.00	0.00	1 on 3
11F	C	15S	13.2	1.3	11.9	7617538.9	724453.7	12/05/01	14:37:16	2608	14.00	153.55	10.97	10.07	11.67	1.60	108.59	7.76	No	7.12	8.40	3-2/>4	1	>4	2	8.65	10.30	3	1.08	10.17	10.87	1 on 3

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
12A A	15S	15.6	1.6	14.0	7615502.5	724537.9	12/05/01	13:12:48	2556	14.02	218.41	15.58	14.22	16.07	1.85	82.63	5.89	No	5.45	6.00	>4	1	>4	0	0.00	0.00	5	0.27	13.77	13.97	1
12B A	15S	27.2	1.7	25.5	7615640.9	724476.2	12/05/01	13:05:34	2546	14.00	259.08	18.51	18.09	18.67	0.57	74.42	5.32	No	4.02	5.97	>4	1	>4	3	6.95	17.92	0	0.00	0.00	0.00	1 on 3
12C A	15S	53.3	1.7	51.6	7616309.4	724231.6	12/05/01	12:59:57	2540	13.97	246.98	17.68	17.52	17.79	0.27	122.83	8.79	No	6.77	11.10	>4	2	>4	0	0.00	0.00	4	0.46	14.27	17.68	1
12D B	5S	47.5	1.7	45.8	7616514.1	724156.9	12/05/01	12:55:35	2535	14.02	270.89	19.32	18.59	20.09	1.50	202.47	14.44	No	12.40	15.40	>4/4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
12E B	15S	46.0	1.7	44.3	7617074.4	723946.1	12/05/01	12:50:38	2530	13.97	287.76	20.60	19.74	21.14	1.40	90.52	6.48	No	5.45	7.07	>4	2	>4	6	10.90	20.44	0	0.00	0.00	0.00	1 on 3
12F B	15S	20.4	1.7	18.7	7617303.6	723858.1	12/05/01	12:44:34	2524	14.00	21.68	1.55	0.00	2.80	2.80	Ind	Ind	No	Ind	Ind	3-2	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
12F C	15S	21.6	1.7	19.9	7617303.2	723859.6	12/05/01	12:45:17	2526	13.97	87.95	6.30	5.60	6.60	1.00	44.80	3.21	No	2.10	4.32	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
13A B	15S	14.4	2.0	12.4	7615301.3	723384.7	12/05/01	11:01:03	2454	14.02	142.20	10.14	9.62	10.77	1.15	98.81	7.05	No	6.57	7.60	>4/4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
13B A	15S	29.5	2.0	27.5	7615386.7	723375.4	12/05/01	11:06:41	2460	14.02	229.15	16.34	16.12	16.34	0.22	69.40	4.95	No	3.57	6.42	>4	2	>4	2	9.67	12.92	0	0.00	0.00	0.00	3
13C C	15S	50.4	1.8	48.6	7615702.2	723367.7	12/05/01	12:19:01	2502	14.02	247.36	17.64	17.37	18.37	1.00	70.08	5.00	No	3.07	7.05	>4	2	>4	2	10.15	11.45	0	0.00	0.00	0.00	1 on 3
13D C	15S	55.5	1.8	53.7	7616099.5	723317.4	12/05/01	12:24:31	2508	14.00	182.92	13.07	11.70	13.40	1.70	81.64	5.83	No	3.53	7.50	>4/4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1 on 3
13E C	15S	43.7	1.8	41.9	7616825.3	723238.6	12/05/01	12:29:53	2514	14.02	278.97	19.90	19.57	20.02	0.45	108.38	7.73	No	7.42	8.05	>4	2	>4	3	3.47	9.82	0	0.00	0.00	0.00	1 on 3
13F A	15S	13.7	1.8	11.9	7617091.3	723220.4	12/05/01	12:34:26	2516	14.00	155.56	11.12	10.35	11.75	1.40	69.05	4.93	No	3.00	6.22	>4/4-3/>4	1	>4	2	5.05	9.37	0	0.00	0.00	0.00	3
14A A	15S	10.0	2.0	8.0	7615216.0	722372.4	12/05/01	10:37:17	2430	14.00	133.98	9.57	9.35	9.65	0.30	69.43	4.96	No	3.67	6.52	>4/4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
14B A	15S	29.0	2.0	27.0	7615328.4	722379.3	12/05/01	10:44:04	2436	14.02	209.98	14.98	14.47	15.20	0.73	56.70	4.04	No	2.82	5.20	>4	1	>4	2	3.87	7.82	0	0.00	0.00	0.00	1 on 3
14C B	5S	59.7	2.0	57.7	7615950.0	722343.6	12/05/01	10:50:29	2443	14.02	297.06	>21.19	>21.19	>21.19	Ind	182.15	>12.99	No	>11.87	>14.67	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
14C E	15S	56.9	0.7	56.2	7615945.8	722337.5	12/10/01	8:10:54	714	14.02	240.04	17.12	16.62	17.24	0.62	240.04	>17.12	Yes	>16.62	>17.24	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
14D C	5S	53.9	2.0	51.9	7616290.4	722300.7	12/05/01	10:32:25	2427	14.00	297.41	>21.25	>21.25	>21.25	Ind	104.93	>7.50	No	>4.42	>8.75	>4	2	>4	4	9.37	18.14	0	0.00	0.00	0.00	3
14D E	15S	51.2	0.8	50.4	7616286.7	722308.3	12/10/01	8:06:03	710	14.00	199.07	14.22	13.07	14.77	1.70	170.31	12.17	No	11.00	12.80	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
14E B	15S	50.1	2.0	48.1	7616688.0	722274.8	12/05/01	10:25:55	2420	14.00	284.68	20.34	20.02	20.47	0.45	83.30	5.95	No	4.30	5.67	>4	2	>4	2	15.15	17.32	0	0.00	0.00	0.00	1 on 3
14F A	15S	21.4	2.0	19.4	7616914.3	722279.2	12/05/01	10:15:51	2408	13.97	150.93	10.80	9.17	12.65	3.47	43.84	3.14	No	2.03	4.40	>4/3-2/>4	1	>4	2	5.92	9.30	0	0.00	0.00	0.00	1 on 3
15A B	5S	16.7	1.6	15.1	7615201.5	721349.3	12/05/01	8:57:05	2353	14.00	66.97	4.79	4.07	5.27	1.20	46.80	3.34	No	2.82	4.02	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
15B A	15S	23.9	1.7	22.2	7615421.4	721352.8	12/05/01	9:05:04	2362	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
15B E	15S	20.9	0.5	20.4	7615421.1	721342.7	12/10/01	9:30:12	768	14.00	26.65	1.90	1.52	2.12	0.60	26.65	>1.90	Yes	>1.52	>2.12	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
15C A	15S	52.4	1.8	50.6	7615677.4	721374.7	12/05/01	9:11:26	2370	14.02	274.89	19.61	18.97	19.99	1.02	107.02	7.63	No	4.35	9.72	>4	0	>4	1	2.83	3.07	0	0.00	0.00	0.00	1 on 2
15D B	15S	53.9	1.8	52.1	7616007.3	721410.3	12/05/01	9:17:31	2378	14.00	262.43	18.75	18.30	19.04	0.75	134.73	9.63	No	8.67	10.50	>4	0	>4	3	7.32	12.47	4	0.67	12.89	16.37	1 on 3
15E A	15S	45.0	1.9	43.1	7616579.2	721456.4	12/05/01	9:26:36	2386	14.02	249.08	17.77	17.47	17.87	0.40	83.31	5.94	No	4.42	8.15	>4	2	>4	5	1.67	14.77	3	0.40	14.92	16.67	1 on 3
15F B	15S	20.2	2.0	18.2	7616821.8	721433.3	12/05/01	10:03:49	2404	14.00	85.11	6.08	5.50	7.70	2.20	60.69	4.34	No	2.35	6.55	>4	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
15F C	15S	20.6	2.0	18.6	7616830.1	721418.3	12/05/01	10:04:31	2406	13.97	153.53	10.99	8.15	13.52	5.37	Ind	Ind	No	Ind	5.25	>4-3	1	>4	1	6.22	6.70	1	0.69	5.20	5.95	1 on 3
16A C	15S	12.4	1.6	10.8	7615070.6	720398.4	12/05/01	8:50:06	2344	13.97	33.82	2.42	0.35	2.97	2.62	Ind	Ind	No	1.45	2.97	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
16A H	15S	12.0	0.5	11.5	7615158.3	720391.8	12/10/01	9:42:14	782	14.00	119.63	8.55	8.35	8.67	0.32	48.86	3.49	No	2.62	6.60	>4/4-3	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
16B C	15S	24.4	1.5	22.9	7615583.7	720490.3	12/05/01	8:40:52	2336	14.00	13.88	0.99	0.65	1.57	0.92	13.88	>0.99	Yes	>0.65	>1.57	4-3	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
16B G	15S	21.5	0.5	21.0	7615580.1	720490.6	12/10/01	9:35:49	774	13.97	4.47	0.32	0.06	0.68	0.62	4.47	>0.32	Yes	>0.06	>0.68	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
16C A	15S	52.4	1.4	51.0	7616037.9	720581.6	12/05/01	8:34:12	2326	14.00	180.78	12.92	12.45	13.35	0.90	68.71	4.91	No	4.20	5.52	>4	1	>4	1	6.67	7.20	5	1.42	8.48	11.92	1 on 3
16D A	15S	51.3	1.3	50.0	7616465.6	720671.0	12/05/01	8:28:48	2320	14.00	289.73	20.70	20.47	20.82	0.35	112.64	8.05	No	6.00	9.17	>4	1	>4	2	12.40	17.70	0	0.00	0.00	0.00	1 on 3
16E D	15S	40.2	1.2	39.0	7616781.7	720735.0	12/05/01	8:22:06	2316	14.02	140.56	10.03	9.65	10.52	0.87	61.29	4.37	No	3.67	5.52	>4	1	>4	2	3.12	4.60	0	0.00	0.00	0.00	1 on 3
17A A	15S	14.8	0.9	13.9	7615023.9	719658.2	11/27/01	9:16:22	14	14.02	39.23	2.80	1.90	3.27	1.37	Ind	Ind	No	Ind	Ind	3-2	-3	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
17B A	15S	18.7	0.9	17.8	7615331.9	719718.8	11/27/01	9:22:10	20	13.95	83.40	5.98	5.92	6.65	0.72	33.91	2.43	No	1.45	2.63	3-2	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
17C A	15S	47.6	0.9	46.7	7615971.9	719843.4	11/27/01	9:28:31	26	14.00	249.27	17.81	17.47	18.12	0.65	33.64	2.40	No	2.05	3.13	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
17D A	15S	50.1	0.8	49.3	7616605.7	719996.3	11/27/01	9:35:25	32	14.00	292.92	20.93	20.74	20.97	0.22	49.06	3.51	No	3.05	4.97	>4	2	>4	5	2.00	14.90	0	0.00	0.00	0.00	1 ON 3
17E B	15S	15.6	0.8	14.8	7616889.4	720053.2	11/27/01	9:47:25	40	14.00	175.87	12.57	12.12	13.00	0.87	36.40	2.60	No	1.87	5.15	3-2/>4	1	>4	1	6.15	6.48	0	0.00	0.00	0.00	1 ON 3
18A C	15S	15.7	0.7	15.0	7615347.4	719078.8	11/27/01	10:36:33	78	14.00	125.63	8.98	7.52	10.00	2.47	125.63	>8.98	Yes	>7.52	>10.00	>4	2	>4	3	5.73	7.70	2	0.37	6.95	7.42	1 ON 3
18B C	15S	26.0	0.7	25.3	7615520.3	719100.3	11/27/01	10:30:58	72	14.00	107.12	7.65	7.27	7.95	0.68	27.06	1.93	No	1.40	2.75	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
18C A	15S	45.7	0.7	45.0	7616057.6	719217.1	11/27/01	10:23:22	62	14.02	223.20	15.92	14.45	16.77	2.32	23.98	1.71	No	0.55	4.92	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
18D A	15S	49.9	0.7	49.2	7616466.0	719304.7	11/27/01	10:14:39	56	14.07	220.19	15.65	15.40	15.85	0.45	40.58	2.88	No	2.15	4.45	>4	1	>4	1	11.12	11.47	2	4.76	12.67	15.72	1 ON 3 R
18E A	15S	44.6	0.8	43.8	7616892.0	719386.8	11/27/01	10:07:15	50	14.00	293.16	20.95	20.27	21.29	1.02	42.42	3.03	No	2.47	3.45	>4	1	>4	2	9.83	12.32	0	0.00	0.00	0.00	1 ON 3
18F A	15S	4.8	0.8	4.0	7617048.9	719416.3	11/27/01	10:00:31	44	14.05	45.72	3.26	2.17	4.80	2.62	Ind	Ind	No	Ind	Ind	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
19A A	15S	3.5	0.7	2.8	7615574.3	718413.6	11/27/01	10:49:18	86	14.05	18.03	1.28	0.70	2.50	1.80	Ind	Ind	No	Ind	Ind	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
19B C	15S	21.1	0.7	20.4	7615686.3	718446.9	11/27/01	10:46:11	84	13.97	100.59	7.20	6.17	7.77	1.60	51.32	3.67	No	2.32	3.83	>4	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	3
19C A	15S	48.3	0.6	47.7	7616493.4	718610.1	11/27/01	10:56:57	92	13.97	49.61	3.55	3.25	3.82	0.57	Ind	Ind	No	Ind	Ind	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
19D A	15S	46.1	0.6	45.5	7616916.5	718696.3	11/27/01	11:02:10	98	13.97	191.60	13.71	12.75	14.70	1.95	33.75	2.42	No	2.27	2.80	>4	0	>4	1	11.52	11.87	0	0.00	0.00	0.00	1 ON 3
19E B	15S	8.8	0.6	8.2	7617174.6	718734.9	11/27/01	11:09:22	106	14.02	98.93	7.06	6.40	7.70	1.30	34.62	2.47	No	1.93	2.75	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
20A A	15S	35.3	0.6	34.7	7615948.7	717802.1	11/27/01	11:36:00	128	14.05	215.76	15.36	14.30	16.15	1.85	56.61	4.03	No	2.53	5.28	>4	2	>4	2	6.67	9.93	0	0.00	0.00	0.00	3
20B B	15S	46.9	0.6	46.3	7616352.1	717892.7	11/27/01	11:43:11	136	14.00	245.35	17.53	17.32	17.67	0.35	23.97	1.71	No	0.75	2.95	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
20C A	15S	54.5	0.6	53.9	7616771.3	717975.4	11/27/01	11:29:18	122	13.97	170.81	12.23	11.37	12.85	1.47	35.30	2.53	No	1.67	3.05	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
20D A	15S	30.9	0.6	30.3	7617332.9	718102.3	11/27/01	11:22:39	116	14.05	281.70	20.06	19.27	20.77	1.50	39.68	2.82	No	1.03	3.55	>4	2	>4	1	9.28	12.85	11	0.84	15.52	20.70	1 ON 3 R
20E A	15S	10.6	0.6	10.0	7617447.1	718129.3	11/27/01	11:17:40	110	13.97	195.11	13.97	12.47	14.92	2.45	33.44	2.39	No	1.62	3.10	>4-3	1	>4	2	4.05	7.30	3	0.20	11.27	14.42	1 ON 3
21A B	15S	9.9	0.6	9.3	7616109.8	717180.1	11/27/01	11:53:58	142	14.00	183.03	13.08	12.47	13.57	1.10	52.49	3.75	No	2.13	4.85	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1 on 3
21B A	15S	35.8	0.6	35.2	7616225.7	717206.8	11/27/01	11:58:16	146	14.05	297.11	21.15	20.77	21.19	0.42	39.56	2.82	No	2.15	3.82	>4	1	>4	1	7.67	8.40	7	1.48	16.02	21.14	1 ON 3
21C A	15S	51.5	0.6	50.9	7616916.5	717356.6	11/27/01	12:04:10	152	13.97	34.41	2.46	2.22	2.62	0.40	Ind	Ind	No	Ind	Ind	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	3
21D B	15S	49.9	0.6	49.3	7617473.6	717451.7	11/27/01	12:10:56	160	13.97	251.85	18.03	17.72	18.22	0.50	40.11	2.87	No	2.67	3.25	>4	1	>4	1	8.15	8.37	1	0.21	14.50	17.82	1 ON 3
21E C	15S	22.0	0.6	21.4	7617662.7	717493.1	11/27/01	12:20:28	168	14.00	162.49	11.61	11.40	11.75	0.35	19.29	1.38	No	0.92	1.58	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
21F A	15S	10.4	0.6	9.8	7617750.8	717516.2	11/27/01	12:23:45	170	14.05	121.35	8.64	7.15	9.70	2.55	16.39	1.17	No	0.30	1.65	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
22A B	15S	11.7	1.7	10.0	7616445.4	716385.5	11/27/01	14:20:21	216	14.00	132.33	9.46	8.07	10.27	2.20	27.44	1.96	No	1.35	3.47	4-3/>4	1	>4	0	0.00	0.00	4	1.94	6.22	8.72	1
22B B	15S	45.5	1.6	43.9	7616621.4	716618.0	11/27/01	14:14:54	210	13.97	287.49	20.58	19.64	21.17	1.52	12.78	0.91	No	0.00	3.27	>4	1	>4	4	5.55	11.67	16	0.77	11.40	19.62	3
22C A	15S	55.0	1.5	53.5	7617385.5	716772.1	11/27/01	14:08:00	202	14.05	266.10	18.95	18.54	19.02	0.47	49.63	3.53	No	3.35	4.47	>4	2	>4	2	8.28	11.87	3	0.55	14.62	17.25	1 ON 3
22D A	15S	19.9	1.5	18.4	7617936.1	716872.3	11/27/01	14:00:14	196	14.00	276.32	19.74	19.34	20.09	0.75	29.61	2.12	No	1.15	2.73	>4	2	>4	0	0.00	0.00	18	1.71	12.67	20.07	1
22E C	15S	10.4	1.4	9.0	7618475.0	717312.0	11/27/01	13:53:54	194	13.97	76.84	5.50	4.87	5.97	1.10	16.56	1.19	No	0.58	1.70	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
22F B	15S	37.7	1.3	36.4	7619065.8	717101.6	11/27/01	13:45:42	186	14.00	288.75	20.63	19.02	21.24	2.22	21.65	1.55	No	0.55	3.03	>4	2	>4	0	0.00	0.00	>25	3.45	10.00	20.63	1

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
22H B	15S	18.3	1.2	17.1	7619625.6	717216.1	11/27/01	13:38:50	180	13.95	263.97	18.93	18.39	19.07	0.67	38.66	2.77	No	2.40	3.20	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
23A B	15S	11.6	1.8	9.8	7616655.7	715913.8	11/27/01	14:30:20	222	14.00	87.01	6.22	5.42	7.20	1.77	43.59	3.11	No	2.45	4.17	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
23B A	5S	39.0	1.9	37.1	7616744.9	715945.5	11/27/01	14:35:13	225	13.97	253.15	18.12	17.62	18.37	0.75	41.92	3.00	No	2.55	3.55	>4	2	>4	2	10.07	16.30	2	0.55	12.07	14.85	1 ON 3
23C B	15S	48.8	2.0	46.8	7617348.6	716128.3	11/27/01	14:44:24	234	13.97	85.78	6.14	5.42	6.67	1.25	Ind	Ind	No	Ind	Ind	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
23D C	15S	40.9	2.0	38.9	7617988.1	716321.4	11/27/01	14:50:02	242	14.00	252.38	18.03	17.09	18.52	1.42	47.49	3.39	No	2.70	4.47	>4	2	>4	3	4.73	10.95	0	0.00	0.00	0.00	1 ON 3
23E A	15S	14.0	2.1	11.9	7618187.1	716353.4	11/27/01	14:55:11	244	14.05	169.90	12.10	11.27	13.32	2.05	39.67	2.82	No	1.71	3.75	>4-3	1	>4	1	2.62	2.95	0	0.00	0.00	0.00	1 on 3
24A A	15S	10.4	2.3	8.1	7616880.1	715271.3	11/27/01	15:32:12	274	14.00	239.52	17.11	16.35	18.50	2.15	47.30	3.38	No	2.44	4.78	>4	1	>4	2	8.70	15.63	1	0.17	12.90	13.15	3
24B B	5S	35.9	2.3	33.6	7616962.3	715303.3	11/27/01	15:27:52	269	14.05	273.04	19.44	18.92	19.57	0.65	43.66	3.11	No	2.52	3.50	>4	2	>4	0	0.00	0.00	8	3.49	13.77	18.34	1
24C B	15S	48.7	2.3	46.4	7617249.6	715421.6	11/27/01	15:21:17	264	14.00	272.83	19.49	18.99	19.64	0.65	38.97	2.78	No	1.90	3.45	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
24D A	15S	58.8	2.2	56.6	7617804.0	715670.1	11/27/01	15:13:58	256	14.05	280.81	19.99	19.44	20.29	0.85	35.46	2.52	No	1.37	2.93	>4	1	>4	3	14.10	18.12	0	0.00	0.00	0.00	3
24E B	15S	29.3	2.2	27.1	7618300.9	715892.3	11/27/01	15:06:31	252	14.00	209.76	14.99	14.35	16.39	2.05	48.97	3.50	No	2.46	4.58	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
25A A	15S	39.1	2.3	36.8	7617220.3	714677.6	11/27/01	15:39:08	280	13.95	281.01	20.15	18.02	21.09	3.07	42.81	3.07	No	2.67	4.27	>4	2	>4	2	7.05	12.92	18	2.82	9.90	21.02	1 on 3
25B A	15S	59.2	2.3	56.9	7617892.5	714968.8	11/27/01	15:44:56	286	14.05	82.61	5.88	5.20	6.82	1.62	40.54	2.89	No	2.30	3.58	4-3	1	>4	1	0.00	0.00	0	0.00	0.00	0.00	1 on 3
25C A	15S	53.1	2.3	50.8	7618481.7	715246.0	11/27/01	15:51:30	292	14.02	122.81	8.76	8.50	8.97	0.47	56.70	4.04	No	4.05	4.85	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
25C B	5S	52.4	2.3	50.1	7618481.4	715240.3	11/27/01	15:52:02	293	14.05	269.71	19.20	18.52	20.19	1.67	45.01	3.20	No	2.85	3.30	>4	2	>4	2	5.38	10.45	0	0.00	0.00	0.00	1 on 3
25D C	15S	12.1	2.3	9.8	7618635.9	715311.0	11/27/01	15:58:36	302	14.00	84.54	6.04	4.87	6.52	1.65	60.74	4.34	No	2.73	6.10	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1 on 3
26A B	15S	6.8	2.3	4.5	7617420.3	714055.9	11/27/01	16:26:58	332	13.95	167.31	12.00	11.82	12.42	0.60	43.57	3.12	No	2.52	4.87	4-3/>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
26B A	15S	22.0	2.3	19.7	7617476.2	714100.5	11/27/01	16:19:10	322	14.02	191.74	13.68	12.67	14.22	1.55	36.28	2.59	No	0.98	3.27	>4	1	>4	3	7.80	9.02	0	0.00	0.00	0.00	3
26C A	15S	50.5	2.3	48.2	7617794.3	714237.8	11/27/01	16:14:36	316	14.00	276.32	19.74	19.64	19.74	0.10	41.75	2.98	No	2.77	3.62	>4	1	>4	2	7.55	14.32	0	0.00	0.00	0.00	3
26D A	15S	59.4	2.3	57.1	7618307.2	714488.3	11/27/01	16:08:53	310	13.97	185.36	13.27	11.45	13.85	2.40	33.45	2.39	No	0.22	3.81	>4-3	1	>4	1	5.90	6.27	0	0.00	0.00	0.00	1 on 3
26E B	15S	42.6	2.3	40.3	7618782.0	714699.6	11/27/01	16:04:14	306	13.97	227.07	16.25	15.37	16.42	1.05	30.03	2.15	No	1.58	3.07	>4-3/>4	1	>4	0	0.00	0.00	8	1.96	10.95	16.37	1
27A C	15S	9.4	2.3	7.1	7617711.3	713481.7	11/27/01	16:41:07	338	13.95	94.69	6.79	6.62	7.24	0.62	33.04	2.37	No	1.68	2.90	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
27B A	15S	30.8	2.3	28.5	7617771.4	713510.0	11/27/01	16:45:17	340	14.02	271.65	19.37	18.72	20.07	1.35	43.13	3.08	No	2.08	3.87	>4	1	>4	1	4.80	4.80	>25	4.50	8.85	20.07	1 on 3
27C A	15S	66.7	2.3	64.4	7618335.6	713769.0	11/27/01	16:55:50	346	14.00	260.70	18.63	17.44	19.24	1.80	30.56	2.18	No	1.45	2.98	>4/3-2	1	>4	2	5.37	16.30	0	0.00	0.00	0.00	1 on 3
27D F	15S	74.6	1.3	73.3	7618730.9	713935.8	12/06/01	9:15:52	16	14.00	223.26	15.95	15.62	16.27	0.65	103.21	7.37	No	5.47	8.52	>4	1	>4	3	0.98	4.77	0	0.00	0.00	0.00	1 on 3
27E A	15S	36.1	2.2	33.9	7618990.3	714051.2	11/27/01	17:08:46	358	14.02	273.63	19.52	18.77	20.09	1.32	44.11	3.15	No	2.20	3.80	>4	1	>4	0	0.00	0.00	20	3.56	14.67	20.07	1 on 3
27F A	15S	29.3	1.2	28.1	7619067.3	714085.7	11/28/01	8:58:13	388	14.02	249.41	17.79	16.47	19.44	2.97	38.15	2.72	No	1.51	4.60	>4	1	>4	0	0.00	0.00	15	5.14	13.00	17.79	1
27G B	15S	39.1	1.2	37.9	7619336.4	714450.4	11/28/01	9:05:17	396	14.00	226.39	16.18	15.25	16.89	1.65	27.53	1.97	No	1.28	3.02	3-2/>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
27H B	5S	40.3	1.1	39.2	7619707.8	714606.0	11/28/01	9:14:07	401	13.95	293.35	21.04	20.54	21.24	0.70	43.86	3.15	No	1.62	3.77	>4	3	>4	0	0.00	0.00	1	0.15	20.02	20.47	1
27I C	5S	40.2	1.1	39.1	7620128.6	714506.7	11/28/01	9:20:34	409	14.00	285.98	20.43	19.29	20.87	1.57	58.49	4.18	No	3.62	4.45	>4	2	>4	2	13.95	15.15	0	0.00	0.00	0.00	1 on 3
28A A	15S	12.5	0.9	11.6	7617934.3	713038.4	11/28/01	10:12:31	442	14.05	241.16	17.17	16.59	17.59	1.00	42.68	3.04	No	2.65	3.62	4-3	0	>4	0	0.00	0.00	>20	4.66	11.20	17.17	1
28B B	5S	36.3	1.0	35.3	7618113.8	712941.4	11/28/01	10:02:55	437	13.95	294.81	21.14	20.84	21.29	0.45	62.09	4.45	No	3.40	5.12	>4	2	>4	1	7.80	8.65	14	5.59	14.00	21.14	1
28C A	15S	60.5	1.0	59.5	7618370.5	713075.3	11/28/01	9:56:02	430	14.05	299.62	21.33	21.19	21.19	Ind	Ind	Ind	No	Ind	Ind	>4	2	>4	0	0.00	0.00	12	1.72	12.00	21.33	Ind
28D A	15S	78.9	1.0	77.9	7618854.5	713306.4	11/28/01	9:47:09	424	14.05	290.56	20.68	20.29	20.72	0.42	55.85	3.98	No	2.82	6.67	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
28E A	15S	45.0	1.0	44.0	7619357.4	713523.6	11/28/01	9:39:03	418	14.05	203.09	14.46	13.17	15.02	1.85	37.00	2.63	No	2.05	3.58	3-2/>4	1	>4	0	0.00	0.00	10	4.36	9.52	13.60	3
28F A	15S	14.4	1.1	13.3	7619628.4	713675.8	11/28/01	9:32:41	412	14.02	282.26	20.13	19.19	20.57	1.37	41.67	2.97	No	1.90	3.05	>4	2	>4	0	0.00	0.00	37	2.82	10.90	20.13	1
29A A	15S	12.8	0.9	11.9	7618291.7	712275.0	11/28/01	10:23:26	448	13.95	246.01	17.64	16.47	18.57	2.10	37.30	2.67	No	1.71	3.45	>4	1	>4	0	0.00	0.00	19	1.53	11.10	17.64	1
29B B	15S	20.6	0.9	19.7	7618352.1	712293.5	11/28/01	10:29:53	456	14.00	173.38	12.39	11.10	12.87	1.78	20.07	1.43	No	0.33	2.40	>4	0	>4	6	3.42	11.47	2	1.06	9.00	12.39	3
29C A	15S	74.5	0.8	73.7	7618893.5	712637.4	11/28/01	10:41:09	463	13.97	280.04	20.05	19.32	20.55	1.23	24.46	1.75	No	0.00	3.70	>4	2	>4	2	10.05	11.93	3	0.06	19.50	20.05	1 on 3
29D B	5S	58.9	0.8	58.1	7619403.4	712944.0	11/28/01	10:59:31	467	13.95	288.23	20.67	19.82	20.92	1.10	58.82	4.22	No	3.37	5.80	>4	2	>4	3	10.02	15.25	3	0.57	19.20	20.67	1 on 3
29E A	15S	28.7	0.8	27.9	7619591.3	713036.7	11/28/01	11:08:29	472	14.02	173.21	12.35	11.50	12.85	1.35	47.94	3.42	No	2.65	3.72	4-3/>4	1	>4	1	0.00	0.00	1	0.18	6.90	7.40	1 on 3
29F B	15S	43.4	0.7	42.7	7619823.6	713175.0	11/28/01	11:15:05	480	14.00	250.76	17.92	17.44	18.02	0.58	37.60	2.69	No	2.50	3.45	>4	0	>4	1	7.02	7.72	0	0.00	0.00	0.00	1 on 3
29G A	15S	51.9	0.7	51.2	7620208.9	713392.8	11/28/01	11:20:44	484	14.00	151.36	10.81	10.10	11.15	1.05	23.49	1.68	No	0.60	2.77	3-2/>4	0	>4	1	4.60	5.10	0	0.00	0.00	0.00	1 on 3
30A A	15S	12.9	0.7	12.2	7618638.9	711677.3	11/28/01	12:04:43	514	14.00	224.63	16.05	15.32	16.64	1.32	32.37	2.31	No	1.75	3.77	>4	1	>4	8	3.05	7.82	7	0.51	10.60	16.05	1 on 3
30B C	15S	34.9	0.7	34.2	7618722.6	711728.5	11/28/01	12:01:30	512	14.02	189.19	13.49	12.57	14.52	1.95	75.03	5.35	No	4.25	6.58	>4	1	>4	1	6.55	6.63	12	1.11	10.30	13.49	1 on 3
30C A	15S	52.8	0.7	52.1	7619026.3	711931.2	11/28/01	11:50:47	502	14.02	177.16	12.64	12.15	13.07	0.92	28.42	2.03	No	0.55	4.30	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
30D B	15S	78.7	0.7	78.0	7619358.4	712145.1	11/28/01	11:43:07	498	13.95	278.13	19.94	19.44	20.17	0.72	37.54	2.69	No	1.98	2.60	>4/3-2	1	>4	2	7.70	9.12	0	0.00	0.00	0.00	1 on 3
30E A	15S	41.9	0.7	41.2	7619828.0	712405.4	11/28/01	11:33:15	490	14.05	193.81	13.80	13.32	13.95	0.62	37.33	2.66	No	2.17	3.85	4-3/>4	1	>4	2	7.02	10.72	2	0.29	7.02	10.72	1 on 3
31A A	15S	33.9	0.6	33.3	7618973.6	711148.8	11/28/01	12:59:22	522	14.05	214.76	15.29	14.77	15.67	0.90	45.48	3.24	No	2.20	4.25	4-3/>4	1	>4	0	0.00	0.00	29	4.60	8.10	15.29	1
31B B	15S	41.9	0.7	41.2	7619028.2	711171.6	11/28/01	13:05:08	530	14.00	248.07	17.73	17.17	18.62	1.45	50.89	3.64	No	3.13	4.00	>4	2	>4	0	0.00	0.00	49	8.34	9.25	18.54	1
31C A	15S	51.6	0.7	50.9	7619285.5	711336.8	11/28/01	13:09:32	534	13.95	157.45	11.29	10.50	11.60	1.10	41.20	2.95	No	1.36	4.45	>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
31D A	15S	73.8	0.7	73.1	7619772.4	711626.0	11/28/01	13:14:31	540	13.95	224.55	16.10	15.35	16.97	1.62	33.78	2.42	No	1.36	3.17	>4	2	>4	4	5.60	8.35	0	0.00	0.00	0.00	1 on 3
31E B	15S	44.9	0.7	44.2	7620128.9	711831.6	11/28/01	13:21:16	548	13.97	246.61	17.65	16.67	18.22	1.55	30.59	2.19	No	1.27	3.23	>4	2	>4	4	6.60	10.75	7	0.15	12.65	16.70	1 on 3
32A B	15S	30.1	1.0	29.1	7619177.3	710751.3	11/28/01	13:55:38	572	13.95	48.76	3.50	2.82	4.42	1.60	48.76	>3.50	Yes	>2.82	>4.42	>4	2	>4	1	0.00	0.00	0	0.00	0.00	0.00	1 on 3
32B A	15S	83.0	0.9	82.1	7619857.6	710935.1	11/28/01	13:44:15	564	13.97	247.35	17.71	17.37	17.94	0.57	37.08	2.65	No	2.27	3.68	>4	1	>4	0	0.00	0.00	4	2.89	12.20	15.90	1
32C A	15S	43.1	0.8	42.3	7620308.6	711299.7	11/28/01	13:37:13	558	14.02	286.50	20.43	20.02	20.52	0.50	41.01	2.92	No	2.75	3.65	>4	1	>4	2	8.88	11.30	16	2.32	14.95	20.27	1 on 3
32D A	15S	25.2	0.8	24.4	7620436.5	711392.3	11/28/01	13:31:21	552	14.02	225.34	16.07	15.77	16.07	0.30	40.34	2.88	No	1.80	4.27	4-3/>4	1	>4	0	0.00	0.00	1	0.57	13.60	13.80	1 on 3
33A C	15S	16.4	1.1	15.3	7619693.6	709994.7	11/28/01	14:05:17	580	13.97	91.58	6.56	5.25	8.17	2.92	27.11	1.94	No	1.40	3.03	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
33B C	5S	43.5	1.2	42.3	7619793.6	710057.2	11/28/01	14:10:44	585	14.00	282.05	20.15	18.52	21.17	2.65	Ind	Ind	No	Ind	Ind	>4	2	>4	0	0.00	0.00	6	0.39	16.70	20.15	1
33C A	15S	57.6	1.2	56.4	7620159.1	710337.7	11/28/01	14:11:47	588	13.97	42.85	3.07	2.72	3.15	0.42	18.99	1.36	No	1.05	1.65	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
33D B	15S	52.6	1.4	51.2	7620645.9	710713.9	11/28/01	14:22:27	596	13.97	33.77	2.42	2.17	2.67	0.50	5.63	0.40	No	0.35	0.73	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
34A A	15S	17.6	1.8	15.8	7620111.6	709467.3	11/28/01	14:57:24	618	13.95	2.18	0.16	0.00	1.20	1.20	Ind	Ind	No	Ind	Ind	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
34B A	15S	53.0	1.7	51.3	7620410.5	709700.7	11/28/01	14:50:21	612	13.97	129.97	9.30	8.97	9.42	0.45	26.64	1.91	No	1.40	2.07	3-2/>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
34C A	15S	58.9	1.6	57.3	7620756.1	709949.9	11/28/01	14:40:34	606	14.00	134.65	9.62	8.80	10.07	1.27	25.94	1.85	No	1.35	2.42	3-2/>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
34D A	15S	19.1	1.5	17.6	7621107.6	710217.3	11/28/01	14:32:13	600	13.97	167.64	12.00	11.77	12.20	0.42	38.63	2.76	No	2.25	4.02	4-3/>4	0	>4	1	0.00	0.00	0	0.00	0.00	0.00	1 on 3
35A A	15S	25.8	1.9	23.9	7620499.7	708970.6	11/28/01	15:05:13	624	14.02	65.27	4.66	4.40	4.95	0.55	11.20	0.80	No	0.43	1.78	3-2/>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
35B C	15S	42.9	2.1	40.8	7620544.2	709006.4	11/28/01	15:27:28	634	13.97	265.68	19.02	18.42	19.74	1.32	40.06	2.87	No	2.48	3.57	>4	2	>4	0	0.00	0.00	26	7.61	11.10	19.00	1
35C C	15S	59.2	2.2	57.0	7620939.1	709314.7	11/28/01	15:35:11	640	13.97	88.84	6.36	6.12	6.70	0.57	17.22	1.23	No	1.17	1.78	4-3	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
35D B	15S	46.5	2.3	44.2	7621304.8	709606.7	11/28/01	15:40:18	644	13.97	251.60	18.01	17.57	18.19	0.62	45.24	3.24	No	2.77	4.00	4-3	1	>4	0	0.00	0.00	24	6.03	1.00	18.00	1

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
35E B	15S	15.0	2.3	12.7	7621418.1	709668.8	11/28/01	15:45:37	650	13.97	185.69	13.29	12.72	13.52	0.80	31.69	2.27	No	1.80	2.72	4-3/>4	-1	>4	1	4.90	6.12	6	0.49	10.80	13.29	1 on 3
36A B	15S	39.5	2.4	37.1	7620974.9	708516.5	11/28/01	16:18:33	674	14.00	91.90	6.57	6.00	7.12	1.12	46.31	3.31	No	2.32	4.25	4-3	-1	>4	2	0.00	0.00	1	0.28	2.43	3.20	1 on 3
36B B	15S	54.5	2.4	52.1	7621202.4	708696.8	11/28/01	16:13:54	668	13.95	101.61	7.29	7.20	7.30	0.10	19.95	1.43	No	1.05	1.93	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
36C B	15S	63.0	2.4	60.6	7621525.2	708939.9	11/28/01	16:08:40	662	13.97	207.17	14.83	14.52	15.17	0.65	26.11	1.87	No	0.78	2.68	>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
36D C	15S	11.2	2.4	8.8	7621762.6	709138.8	11/28/01	16:02:30	658	13.97	53.36	3.82	3.10	4.07	0.97	Ind	Ind	No	Ind	Ind	-4.00	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
37A C	15S	15.2	2.4	12.8	7621350.9	707923.1	11/28/01	16:26:21	682	13.97	141.76	10.15	8.82	10.70	1.87	10.35	0.74	No	0.50	1.12	3-2	1	>4	0	0.00	0.00	1	1.20	8.70	9.85	1
37B A	15S	51.9	2.4	49.5	7621448.6	708017.3	11/28/01	16:29:26	684	13.97	177.78	12.73	12.32	13.02	0.70	38.64	2.77	No	2.22	3.63	>4	1	>4	0	0.00	0.00	1	0.00	0.00	0.00	1
37C A	15S	52.5	2.4	50.1	7621787.0	708296.5	11/28/01	16:35:15	690	14.02	49.59	3.54	3.10	4.12	1.02	Ind	Ind	No	Ind	Ind	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
37D A	15S	32.0	1.5	30.5	7622107.5	708537.0	11/29/01	8:35:27	726	14.02	107.48	7.67	7.27	7.95	0.67	32.33	2.31	No	1.82	2.80	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
37E A	15S	11.5	1.6	9.9	7622217.1	708550.2	11/29/01	8:23:16	718	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
38A B	15S	20.3	1.4	18.9	7621821.4	707439.2	11/29/01	9:07:20	758	13.97	66.50	4.76	3.37	5.80	2.42	52.15	3.73	No	2.65	4.12	>4	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	2
38B B	15S	44.3	1.4	42.9	7621887.7	707502.6	11/29/01	9:02:05	752	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
38C C	15S	56.9	1.4	55.5	7622092.4	707717.8	11/29/01	8:56:54	748	14.02	79.81	5.69	5.40	6.02	0.62	22.41	1.60	No	1.03	2.25	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
38D A	15S	37.7	1.5	36.2	7622512.4	708139.3	11/29/01	8:48:15	738	14.02	120.89	8.62	8.22	8.77	0.55	30.43	2.17	No	1.50	2.56	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
38E B	15S	18.4	1.5	16.9	7622565.4	708199.3	11/29/01	8:44:44	734	14.00	209.32	14.96	14.55	15.45	0.90	31.05	2.22	No	1.27	2.75	>4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
39A A	15S	8.6	1.3	7.3	7622212.4	706815.5	11/29/01	9:14:52	762	14.02	265.92	18.97	18.69	18.99	0.30	34.96	2.49	No	2.45	2.87	>4	2	>4	0	0.00	0.00	28	1.66	9.00	19.00	1
39B A	5S	27.7	1.3	26.4	7622293.6	706890.0	11/29/01	9:19:49	767	14.05	290.44	20.68	19.84	20.97	1.12	49.01	3.49	No	3.12	4.30	>4	2	>4	0	0.00	0.00	18	4.07	13.00	21.00	1
39C A	15S	49.6	1.3	48.3	7622486.3	707133.5	11/29/01	9:25:47	774	13.97	181.29	12.98	12.30	13.32	1.02	27.55	1.97	No	1.58	2.22	>4/3-2	1	>4	1	2.55	4.48	0	0.00	0.00	0.00	1 on 3
39D B	15S	53.2	1.3	51.9	7622795.0	707459.6	11/29/01	9:31:34	782	13.97	97.06	6.95	6.80	7.07	0.27	27.03	1.93	No	1.52	2.32	>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
39E B	15S	21.2	1.2	20.0	7623009.6	707685.7	11/29/01	9:52:56	788	13.97	0.00	0.00	0.00	0.00	0.00	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
39F C	15S	11.6	1.2	10.4	7623085.2	707713.4	11/29/01	9:59:50	796	13.97	63.01	4.51	3.55	5.62	2.07	32.04	2.29	No	1.22	3.42	>4-3	0	>4	1	1.70	2.38	0	0.00	0.00	0.00	3
40A A	15S	10.3	1.0	9.3	7622645.0	706413.8	11/29/01	10:35:30	822	14.02	241.39	17.22	16.77	17.57	0.80	45.61	3.25	No	2.37	3.47	>4	2	>4	1	5.10	5.52	17	2.26	4.55	16.72	1 on 3
40B C	15S	25.6	1.1	24.5	7622741.9	706522.6	11/29/01	10:30:56	820	13.95	219.70	15.75	14.97	16.64	1.67	43.99	3.15	No	2.50	3.72	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
40C A	15S	53.0	1.1	51.9	7622857.1	706649.2	11/29/01	10:24:22	810	14.02	247.47	17.65	17.14	17.72	0.57	43.55	3.11	No	2.80	3.80	>4	2	>4	0	0.00	0.00	19	1.69	9.40	17.65	1
40D C	15S	55.3	1.1	54.2	7623147.1	706959.1	11/29/01	10:20:17	808	13.97	70.61	5.05	4.55	5.90	1.35	70.61	>5.05	Yes	>4.55	>5.90	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
40E B	15S	34.0	1.1	32.9	7623470.9	707301.3	11/29/01	10:12:42	800	13.97	164.29	11.76	11.30	12.07	0.77	Ind	Ind	No	Ind	Ind	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
41A C	15S	9.3	1.0	8.3	7623353.0	706033.8	11/29/01	10:46:45	832	14.02	116.84	8.33	7.50	8.77	1.27	39.78	2.84	No	1.73	3.62	>4	2	>4	7	1.60	4.40	0	0.00	0.00	0.00	3
41B A	15S	51.2	1.0	50.2	7623543.1	706366.2	11/29/01	10:54:00	834	14.05	209.24	14.90	14.50	15.95	1.45	41.25	2.94	No	3.50	0.75	>4/4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
41C C	15S	58.7	1.0	57.7	7623694.6	706627.8	11/29/01	11:01:24	844	14.00	104.56	7.47	7.22	7.80	0.57	29.39	2.10	No	0.90	2.48	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
41D C	15S	29.1	0.9	28.2	7623893.8	706975.5	11/29/01	11:07:20	850	14.00	209.36	14.96	13.30	15.92	2.62	52.21	3.73	No	2.35	5.45	>4	1	>4	0	0.00	0.00	2	0.73	6.30	11.20	1
42A B	15S	8.4	1.8	6.6	7623930.6	705694.9	11/29/01	8:05:44	1130	14.02	199.71	14.24	12.85	14.90	2.05	22.58	1.61	No	0.33	2.25	>4	2	>4	0	0.00	0.00	>50	5.14	6.30	14.50	1
42B C	15S	46.7	1.8	44.9	7623933.7	705768.8	11/29/01	7:57:05	1126	14.02	263.97	18.83	17.82	19.87	2.05	Ind	Ind	No	Ind	Ind	>4	2	>4	0	0.00	0.00	>50	9.82	4.07	20.02	Ind
42C C	15S	55.1	0.9	54.2	7624185.1	706168.5	11/29/01	11:25:00	868	13.97	86.74	6.21	5.85	6.50	0.65	19.60	1.40	No	1.05	1.68	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
42D C	15S	23.0	0.9	22.1	7624440.5	706617.7	11/29/01	11:19:11	962	13.95	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
42E B	15S	9.1	0.9	8.2	7624502.8	706705.5	11/29/01	11:13:00	954	13.95	74.17	5.32	3.50	6.95	3.45	32.65	2.34	No	1.06	2.73	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
43A A	15S	8.6	0.8	7.8	7624450.5	705340.9	11/29/01	11:41:09	870	14.05	186.87	13.30	12.37	14.37	2.00	21.81	1.55	No	0.80	1.85	4-3	1	>4	0	0.00	0.00	>50	14.46	3.72	14.15	1
43B C	15S	38.6	0.8	37.8	7624484.3	705441.2	11/29/01	11:48:24	880	14.00	12.35	0.88	0.55	1.35	0.80	Ind	Ind	No	Ind	Ind	-2--3	-3	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
43C C	15S	53.7	0.8	52.9	7624654.3	705709.6	11/29/01	11:53:31	886	13.97	152.41	10.91	10.47	11.17	0.70	22.84	1.64	No	1.37	2.15	>4/4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
43D B	15S	51.9	0.8	51.1	7624808.7	705955.1	11/29/01	12:00:12	890	14.00	37.54	2.68	1.95	4.15	2.20	Ind	Ind	No	Ind	Ind	2-1	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
43E B	15S	33.5	0.8	32.7	7625004.9	706280.2	11/29/01	12:05:22	896	13.97	105.54	7.55	5.65	8.47	2.82	24.89	1.78	No	1.30	2.17	4-3/>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
43F C	15S	13.7	0.8	12.9	7625067.0	706348.4	11/29/01	12:10:33	904	14.02	171.96	12.26	11.90	12.47	0.57	38.85	2.77	No	2.10	2.78	4-3/>4	1	>4	1	9.55	11.27	0	0.00	0.00	0.00	1 on 3
44A A	15S	10.6	0.7	9.9	7625048.3	705031.0	11/29/01	13:23:39	932	14.00	165.32	11.81	11.57	12.17	0.60	26.46	1.89	No	1.00	3.17	>4/4-3/>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
44B B	15S	52.5	0.7	51.8	7625177.4	705242.0	11/29/01	13:19:55	928	13.97	245.89	17.60	16.79	18.12	1.32	21.83	1.56	No	0.78	2.13	>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
44C A	15S	50.3	0.7	49.6	7625346.0	705520.3	11/29/01	13:14:52	920	13.97	46.68	3.34	2.52	5.35	2.82	Ind	Ind	No	Ind	Ind	1-0	-2	2	0	0.00	0.00	0	0.00	0.00	0.00	Ind
44D B	15S	26.2	0.7	25.5	7625613.0	705989.5	11/29/01	13:10:27	916	13.95	5.30	0.38	0.00	2.02	2.02	Ind	Ind	No	Ind	Ind	>4	>4	>4	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
44E C	15S	8.6	0.7	7.9	7625658.3	706059.2	11/29/01	13:06:02	912	14.00	209.22	14.95	14.30	15.30	1.00	Ind	Ind	No	Ind	Ind	2-1	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
45A C	15S	7.8	0.8	7.0	7625583.2	704691.7	11/29/01	13:56:03	948	13.97	82.87	5.93	5.50	6.42	0.92	15.25	1.09	No	0.80	1.60	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
45B B	15S	47.4	0.8	46.6	7625650.5	704800.6	11/29/01	13:59:57	952	13.95	213.09	15.28	14.57	15.92	1.35	12.62	0.90	No	0.52	1.17	>4/3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
45C C	15S	53.6	0.8	52.8	7625933.0	705281.2	11/29/01	14:06:33	960	14.00	152.77	10.92	10.80	11.00	0.20	20.11	1.44	No	1.05	1.62	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
45D C	15S	21.8	0.9	20.9	7626252.0	705792.9	11/29/01	14:11:34	966	13.97	267.32	19.13	18.64	19.52	0.87	42.95	3.07	No	2.20	3.90	>4	2	>4	4	5.77	10.50	28	3.07	9.20	19.13	1 on 3
45E B	15S	13.9	0.9	13.0	7626287.8	705892.1	11/29/01	14:14:38	970	13.97	233.19	16.69	15.47	17.17	1.70	34.26	2.45	No	1.59	3.32	>4	2	>4	2	9.00	11.42	1	0.27	12.50	15.50	1 on 3
46A A	15S	11.3	1.4	9.9	7626104.8	704322.2	11/29/01	14:53:44	1004	14.02	60.29	4.30	2.80	5.42	2.62	44.09	3.14	No	2.60	3.38	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
46B A	15S	30.3	1.3	29.0	7626155.9	704399.8	11/29/01	14:47:42	998	14.02	83.62	5.96	5.12	7.02	1.90	41.30	2.95	No	2.02	3.96	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
46C B	15S	48.8	1.2	47.6	7626259.0	704547.6	11/29/01	14:43:55	994	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
46D B	15S	50.1	1.2	48.9	7626446.5	704816.3	11/29/01	14:38:58	988	13.97	94.51	6.76	6.42	7.22	0.80	21.62	1.55	No	1.02	2.40	3-2/>4	1	>4	1	3.77	4.65	0	0.00	0.00	0.00	1 on 3
46E C	15S	37.8	1.1	36.7	7626997.3	705681.4	11/29/01	14:33:07	984	14.05	254.80	18.14	17.52	18.52	1.00	46.54	3.31	No	1.65	3.47	>4	1	>4	6	5.90	16.37	0	0.00	0.00	0.00	1 on 3
46F A	15S	18.7	1.0	17.7	7627054.1	705784.1	11/29/01	14:21:28	974	13.97	248.59	17.79	17.29	18.34	1.05	49.06	3.51	No	2.43	4.70	>4	1	>4	8	6.32	13.90	0	0.00	0.00	0.00	1 on 3
47A C	15S	20.6	1.5	19.1	7626528.5	703888.9	11/29/01	15:02:19	1014	13.97	210.09	15.04	13.37	16.42	3.05	31.39	2.25	No	0.90	3.25	>4	1	>4	0	0.00	0.00	18	1.17	6.20	15.04	1
47B A	15S	39.6	1.5	38.1	7626598.4	703985.5	11/29/01	15:06:04	1016	13.97	266.66	19.09	18.92	19.34	0.42	51.00	3.65	No	3.00	4.10	>4	1	>4	4	6.42	11.80	20	1.84	12.80	19.09	1 on 3
47C A	15S	55.9	1.6	54.3	7626886.7	704283.6	11/29/01	15:12:01	1024	14.02	63.80	4.55	4.02	5.10	1.07	Ind	Ind	No	Ind	Ind	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
47D A	15S	28.5	1.7	26.8	7627350.3	704801.5	11/29/01	15:17:44	1028	13.97	98.27	7.03	6.27	7.75	1.47	37.38	2.68	No	2.12	3.50	>4/3-2	-1	>4	1	2.92	4.33	0	0.00	0.00	0.00	1 on 3
47E A	15S	14.6	1.8	12.8	7627369.6	704822.8	11/29/01	15:28:14	1034	14.02	82.99	5.92	4.30	7.07	2.77	7.22	0.52	No	0.38	0.65	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
48A B	15S	19.0	2.3	16.7	7626950.5	703445.3	11/29/01	16:16:21	1072	14.00	238.67	17.05	16.44	17.34	0.90	32.75	2.34	No	2.05	2.87	>4	1	>4	1	5.17	5.72	19	1.90	9.60	17.05	1 on 3
48B B	15S	30.4	2.3	28.1	7627034.0	703517.7	11/29/01	16:12:17	1066	14.02	229.35	16.35	14.30	18.02	3.72	47.90	3.42	No	1.83	4.90	>4	1	>4	0	0.00	0.00	3	1.51	9.00	13.00	1
48C A	15S	50.6	2.3	48.3	7627192.6	703680.5	11/29/01	16:06:38	1058	13.97	292.54	20.94	20.54	21.17	0.63	56.81	4.07	No	3.67	4.37	>4	1	>4	3	8.37	17.54	21	1.61	14.40	20.94	1 on 3
48D B	15S	59.9	2.2	57.7	7627551.3	704054.1	11/29/01	16:01:31	1054	13.97	252.66	18.08	17.94	18.45	0.50	32.41	2.32	No	1.46	3.00	>4/3-2	1	>4	2	4.72	11.87	0	0.00	0.00	0.00	3
48E A	15S	20.0	2.1	17.9	7627873.6	704397.4	11/29/01	15:52:48	1046	14.05	169.07	12.04	11.17	12.30	1.13	62.68	4.46	No	2.65	5.98	>4	2	>4	1	1.62	2.07	0	0.00	0.00	0.00	3
48F B	15S	12.1	2.1	10.0	7627989.6	704509.7	11/29/01	15:46:40	1042	14.00	189.90	13.57	12.07	14.55	2.47	41.71	2.98	No	2.42	3.32	>4	1	>4	4	7.22	11.10	0	0.00	0.00	0.00	3
49A A	15S	9.8	2.4	7.4	7627378.9	702931.8	11/29/01	16:23:13	1076	13.97	168.21	12.04	11.30	12.72	1.42	21.99	1.57	No	1.00	1.90	>4-3	1	>4	0	0.00	0.00	25	9.56	6.80	9.30	1

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
49B A	15S	22.2	2.4	19.8	7627462.9	703032.1	11/29/01	16:27:12	1082	13.97	186.54	13.35	12.60	13.82	1.22	53.11	3.80	No	3.33	4.90	>4	-1	>4	3	6.10	8.62	0	0.00	0.00	0.00	1 on 3
49C B	5S	44.4	2.5	41.9	7627584.8	703146.1	11/29/01	16:34:45	1089	14.02	292.01	20.83	19.92	21.22	1.30	55.18	3.94	No	2.64	4.45	>4	1	>4	0	0.00	0.00	20	2.88	10.40	20.83	1
49E A	15S	22.1	1.7	20.4	7628404.2	703982.8	11/30/01	8:28:09	1140	14.02	112.52	8.03	7.40	8.82	1.42	26.39	1.88	No	1.18	2.75	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
49F B	15S	9.2	1.8	7.4	7628491.8	704076.3	11/30/01	8:23:22	1136	14.00	179.64	12.84	12.40	13.27	0.87	45.28	3.24	No	2.57	3.88	>4	1	>4	1	9.50	10.03	6	0.65	8.30	12.84	1
50A A	15S	15.4	1.4	14.0	7627889.0	702501.2	11/30/01	9:51:23	1170	14.00	227.73	16.27	15.10	16.87	1.77	27.37	1.96	No	1.63	2.20	>4	2	>4	2	4.12	10.20	5	0.35	11.30	16.27	1 on 3
50B A	15S	40.6	1.5	39.1	7627981.0	702569.8	11/30/01	9:43:49	1164	14.00	289.18	20.66	18.95	21.12	2.17	59.70	4.27	No	3.47	4.97	>4	1	>4	0	0.00	0.00	24	2.23	12.60	20.66	1
50C C	15S	54.0	1.5	52.5	7628287.9	702920.8	11/30/01	9:40:26	1162	14.00	123.66	8.84	8.67	8.92	0.25	42.74	3.05	No	2.07	4.27	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
50D C	5S	68.1	1.5	66.6	7628472.0	703152.3	11/30/01	9:32:47	1155	13.97	291.20	20.84	20.24	21.14	0.90	61.67	4.41	No	2.63	6.10	>4	1	>4	2	9.72	14.32	5	1.97	13.90	20.00	1 on 3
50E A	15S	22.7	1.7	21.0	7628903.7	703552.1	11/30/01	8:53:01	1146	13.97	281.67	20.16	19.75	20.92	1.17	50.98	3.65	No	2.25	4.70	>4	1	>4	1	10.25	10.60	27	2.81	12.30	20.50	1 on 3
51A B	15S	16.7	1.4	15.3	7628325.6	701964.8	11/30/01	10:02:48	1178	13.97	169.73	12.15	11.67	12.62	0.95	23.64	1.69	No	1.25	2.73	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
51A C	15S	18.1	1.4	16.7	7628323.6	701968.5	11/30/01	10:03:29	1180	14.00	99.29	7.09	6.32	7.70	1.37	25.01	1.79	No	1.45	2.31	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
51B A	15S	36.9	1.4	35.5	7628392.0	702033.7	11/30/01	10:06:35	1182	14.02	283.91	20.25	19.79	20.62	0.82	60.23	4.30	No	3.42	5.32	>4	1	>4	0	0.00	0.00	38	5.28	9.60	20.00	1
51C A	5S	47.7	1.3	46.4	7628559.8	702219.8	11/30/01	10:12:19	1187	14.05	300.50	>21.22	>21.22	>21.22	Ind	48.27	>3.44	No	>2.95	>4.62	>4	2	>4	0	0.00	0.00	31	4.65	13.90	21.20	1
51D B	15S	67.0	1.3	65.7	7628938.1	702625.0	11/30/01	10:19:00	1196	13.97	278.23	19.92	19.02	20.39	1.37	62.83	4.50	No	3.20	6.25	>4	0	>4	1	6.67	7.16	5	1.76	13.50	19.10	1 on 3
51E A	15S	21.9	1.3	20.6	7629440.8	703136.7	11/30/01	10:24:54	1200	14.00	224.88	16.07	15.87	16.39	0.52	36.71	2.62	No	1.70	2.78	>4	2	>4	9	3.35	13.25	4	0.31	9.60	16.07	1 on 3
51F B	15S	16.9	1.3	15.6	7629588.5	703257.1	11/30/01	10:34:03	1208	14.00	149.56	10.69	8.95	12.87	3.92	41.41	2.96	No	2.01	3.45	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
52A B	15S	14.2	1.1	13.1	7628734.1	701495.2	11/30/01	11:11:52	1238	14.00	246.87	17.64	16.92	17.94	1.02	53.79	3.84	No	2.10	4.55	>4	0	>4	0	0.00	0.00	31	5.56	7.00	17.64	1
52B A	5S	22.4	1.1	21.3	7628758.9	701518.3	11/30/01	11:05:02	1229	14.02	297.24	>21.20	>21.20	>21.20	Ind	33.23	>2.37	No	>1.27	>2.62	>4	1	>4	0	0.00	0.00	35	7.76	0.00	21.20	1
52B D	15S	21.5	1.1	20.4	7628750.7	701526.4	12/07/01	17:41:34	674	14.02	238.15	16.99	15.02	17.64	2.62	119.98	8.56	No	6.55	9.22	>4	2	>4	2	9.92	11.17	9	2.66	10.75	16.99	1 on 3
52C A	15S	53.8	1.1	52.7	7629144.1	701911.4	11/30/01	11:00:17	1224	14.00	117.73	8.41	7.72	8.75	1.02	36.67	2.62	No	1.95	2.80	>4/4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
52D B	15S	55.2	1.2	54.0	7629427.2	702227.3	11/30/01	10:51:48	1218	14.02	212.67	15.17	14.62	15.35	0.73	29.37	2.10	No	1.53	2.63	>4	0	>4	0	0.00	0.00	4	0.13	13.50	13.50	1
52E B	15S	23.2	1.2	22.0	7630023.5	702627.5	11/30/01	10:44:27	1214	13.97	199.62	14.29	13.40	14.92	1.52	30.81	2.21	No	1.43	2.73	3-2/>4	0	>4	1	6.10	6.50	3	2.10	7.80	10.80	1 on 3
53A B	15S	18.1	1.1	17.0	7628685.9	700492.7	11/30/01	11:25:01	1244	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
53B A	5S	41.8	1.0	40.8	7628748.8	700558.1	11/30/01	11:31:41	1247	14.05	289.38	20.60	19.84	20.97	1.12	44.23	3.15	No	2.40	4.05	>4	1	>4	0	0.00	0.00	46	3.60	9.00	20.60	1
53C A	15S	51.9	1.0	50.9	7629231.3	701055.0	11/30/01	11:38:59	1254	14.02	101.53	7.24	6.77	7.65	0.87	61.24	4.37	No	4.15	4.83	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
53C C	15S	51.3	1.0	50.3	7629233.0	701063.7	11/30/01	11:40:23	1258	13.97	143.40	10.26	8.30	12.07	3.77	64.57	4.62	No	2.93	5.10	>4	2	>4	3	3.15	3.88	1	0.06	9.52	9.85	1 on 3
53D C	15S	60.0	1.0	59.0	7629818.6	701694.8	11/30/01	11:51:04	1264	14.00	226.35	16.17	15.87	16.65	0.78	50.62	3.62	No	2.80	5.08	>4	0	>4	1	13.52	14.30	0	0.00	0.00	0.00	1 on 3
53E A	15S	25.7	1.0	24.7	7630400.2	702262.8	11/30/01	11:57:01	1266	14.05	246.88	17.58	17.02	17.64	0.62	47.75	3.40	No	2.57	3.70	>4	2	>4	2	10.55	13.15	9	2.56	12.10	16.20	1 on 3
54A A	15S	13.1	0.8	12.3	7629154.6	700024.5	11/30/01	13:11:42	1298	14.00	72.40	5.17	4.07	5.75	1.67	39.93	2.85	No	2.20	3.40	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
54B B	15S	32.9	0.8	32.1	7629501.3	700391.9	11/30/01	13:06:12	1294	13.97	89.14	6.38	5.00	7.10	2.10	13.86	0.99	No	0.55	1.07	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
54C B	15S	51.2	0.8	50.4	7630041.0	700926.2	11/30/01	12:58:38	1288	13.97	221.01	15.82	14.92	16.52	1.60	41.66	2.98	No	2.37	3.10	>4	1	>4	1	8.20	8.90	2	0.28	10.50	14.10	1 on 3
54D A	15S	39.8	0.8	39.0	7630899.2	701791.4	11/30/01	12:51:34	1280	13.97	271.82	19.46	18.84	19.77	0.92	60.60	4.34	No	3.50	5.45	>4	1	>4	2	8.05	11.67	0	0.00	0.00	0.00	1 on 3
54E C	15S	26.3	0.8	25.5	7630949.2	701870.3	11/30/01	12:48:14	1278	14.02	221.83	15.82	15.02	16.74	1.72	55.23	3.94	No	2.40	4.57	>4	1	>4	3	6.95	9.92	20	2.77	10.10	15.82	1 on 3
55A A	15S	15.8	0.8	15.0	7629962.3	699984.0	11/30/01	13:25:16	1304	14.02	56.57	4.03	3.72	4.37	0.65	33.14	2.36	No	2.37	3.05	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
55B C	5S	46.4	0.8	45.6	7630293.2	700274.6	11/30/01	13:33:54	1313	14.02	298.47	>21.29	>21.29	>21.29	Ind	46.28	>3.30	No	>2.85	>5.35	>4	2	>4	3	6.72	12.97	36	4.34	12.30	>21.29	3
55B D	15S	45.9	1.2	44.7	7630308.1	700283.9	12/07/01	17:33:13	668	14.00	166.65	11.91	11.60	12.07	0.47	86.96	6.21	No	5.52	6.82	>4	2	>4	2	1.67	8.72	0	0.00	0.00	0.00	1 on 3
55C B	15S	66.2	0.8	65.4	7631075.5	701077.0	11/30/01	13:40:27	1318	13.97	252.16	18.05	17.67	18.52	0.85	59.80	4.28	No	3.82	4.35	>4	1	>4	3	7.77	12.75	1	0.04	16.60	16.60	1 on 3
55D A	15S	30.3	0.8	29.5	7631558.4	701575.5	11/30/01	13:45:16	1322	13.97	222.93	15.96	15.62	16.47	0.85	41.35	2.96	No	2.57	3.37	>4	1	>4	7	6.15	15.30	3	1.68	13.10	15.96	1 on 3
55E A	15S	17.1	0.8	16.3	7631619.8	701645.4	11/30/01	13:50:19	1328	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
56A B	15S	12.4	0.8	11.6	7630434.3	699457.6	11/30/01	14:34:17	1366	14.00	235.69	16.84	15.97	17.64	1.67	33.10	2.37	No	1.25	3.00	>4-3	0	>4	0	0.00	0.00	37	3.01	9.00	16.84	1 on 3
56B B	15S	33.6	0.8	32.8	7630538.0	699552.5	11/30/01	14:27:45	1360	14.02	189.71	13.53	13.12	14.07	0.95	13.61	0.97	No	0.48	1.15	3-2/>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
56C C	5S	56.8	0.8	56.0	7631099.9	700198.4	11/30/01	14:22:10	1355	14.00	280.24	20.02	19.67	20.29	0.62	79.28	5.66	No	2.82	6.45	>4	1	>4	1	10.35	11.15	1	0.24	19.00	19.00	1 on 3
56D A	15S	42.5	0.8	41.7	7632137.8	701252.1	11/30/01	14:11:43	1346	14.02	209.85	14.97	14.67	15.02	0.35	22.03	1.57	No	1.23	2.10	>4	3	>4	5	8.20	14.02	0	0.00	0.00	0.00	1 on 3
56E C	15S	45.9	0.8	45.1	7632295.1	701422.4	11/30/01	14:06:36	1344	14.02	257.54	18.37	17.44	18.77	1.32	57.64	4.11	No	1.96	5.25	>4	2	>4	1	17.37	17.52	0	0.00	0.00	0.00	1 on 3
56F C	15S	24.6	0.8	23.8	7632733.1	701862.4	11/30/01	14:01:20	1338	14.00	63.98	4.57	4.37	5.07	0.70	46.65	3.33	No	1.18	4.31	3-2	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
57A C	15S	10.0	0.9	9.1	7630915.9	699011.5	11/30/01	14:43:23	1374	14.02	190.29	13.57	13.07	13.67	0.60	34.16	2.44	No	1.90	2.67	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
57B A	5S	33.7	0.9	32.8	7631009.3	699103.2	11/30/01	14:46:06	1375	13.97	296.79	>21.24	>21.24	>21.24	Ind	47.56	>3.40	No	>2.00	>4.67	>4	2	>4	1	6.12	6.40	28	4.01	9.80	>21.24	3
57B D	15S	32.0	1.2	30.8	7631011.2	699088.9	12/07/01	17:23:06	662	13.97	203.82	14.59	14.22	15.02	0.80	102.47	7.33	No	6.60	7.47	>4	2	>4	1	10.00	10.70	1	0.10	12.47	12.72	1 on 3
57C A	15S	55.0	1.0	54.0	7631817.4	699970.1	11/30/01	14:54:30	1382	14.02	244.77	17.46	16.99	17.74	0.75	67.04	4.78	No	4.35	5.87	>4	1	>4	1	11.80	12.17	0	0.00	0.00	0.00	1 on 3
57D B	15S	55.5	1.0	54.5	7632237.4	700418.5	12/06/01	17:43:07	334	13.97	177.20	12.68	11.87	13.70	1.82	69.27	4.96	No	3.43	6.67	>4	1	>4	1	11.65	12.37	0	0.00	0.00	0.00	3
57E A	15S	49.1	1.0	48.1	7632782.2	700995.7	12/06/01	17:32:29	326	14.00	137.38	9.82	9.65	9.95	0.30	25.51	1.82	No	1.32	2.30	>4	3	>4	3	6.72	9.40	0	0.00	0.00	0.00	1 on 3
57F B	15S	39.7	1.1	38.6	7633043.9	701279.5	12/06/01	17:18:57	318	14.00	116.74	8.34	7.65	8.62	0.98	52.29	3.74	No	2.45	4.55	>4	2	>4	1	5.40	5.80	0	0.00	0.00	0.00	1 on 3
57G A	15S	35.1	1.1	34.0	7633504.3	701770.5	12/06/01	17:11:26	310	14.02	224.60	16.02	15.20	16.62	1.42	68.29	4.87	No	3.93	5.82	>4	2	>4	0	0.00	0.00	31	2.75	10.62	16.02	1
58A A	15S	12.9	1.3	11.6	7631340.8	698520.0	11/30/01	15:19:44	1406	14.00	206.85	14.78	14.20	15.00	0.80	37.16	2.66	No	2.00	2.50	4-3/>4	0	>4	0	0.00	0.00	39	6.59	9.00	14.78	1
58B B	15S	26.8	1.2	25.6	7631422.1	698558.9	11/30/01	15:14:48	1402	13.97	218.77	15.66	15.02	16.00	0.98	29.33	2.10	No	1.27	2.30	>4	1	>4	4	3.17	10.32	49	8.44	4.60	15.66	1 on 3
58C A	15S	48.6	1.1	47.5	7631885.4	699092.5	11/30/01	15:06:45	1394	13.97	292.78	20.96	20.74	21.17	0.42	65.68	4.70	No	4.50	5.00	>4	1	>4	2	9.52	19.32	7	1.22	17.20	20.96	1 on 3
58D A	15S	53.2	1.0	52.2	7632370.2	699607.6	11/30/01	15:01:05	1388	14.02	290.15	20.69	20.44	20.97	0.52	43.35	3.09	No	2.98	5.00	>4	0	>4	2	10.60	15.00	6	0.48	16.10	20.69	1 on 3
58E B	15S	39.9	1.1	38.8	7633697.2	700983.4	12/06/01	17:03:11	306	13.95	170.60	12.23	11.95	12.72	0.77	57.76	4.14	No	3.30	4.62	>4	1	>4	1	10.57	11.20	1	1.01	10.87	12.23	1 on 3
58F A	15S	30.3	1.1	29.2	7633971.1	701272.9	12/06/01	16:56:10	298	14.00	97.24	6.95	6.20	8.27	2.07	42.74	3.05	No	1.88	3.65	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
59A A	15S	11.7	1.4	10.3	7631508.3	697781.5	11/30/01	15:28:57	1412	14.02	211.52	15.09	13.82	15.42	1.60	47.33	3.38	No	2.73	3.72	4-3	0	>4	0	0.00	0.00	13	2.70	10.10	15.09	1
59B C	5S	20.5	1.5	19.0	7631674.8	697915.0	11/30/01	15:35:56	1421	13.97	112.64	8.06	7.77	8.60	0.82	10.09	0.72	No	0.40	1.15	3-2/>4-3	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
59C A	15S	36.7	1.6	35.1	7632117.5	698396.1	11/30/01	15:42:29	1424	14.02	263.27	18.78	18.22	19.92	1.70	36.19	2.58	No	0.65	3.67	>4	1	>4	0	0.00	0.00	32	3.60	8.50	18.78	1
59D A	15S	55.6	1.7	53.9	7632646.5	698960.7	11/30/01	15:48:35	1430	14.00	287.86	20.57	20.07	20.69	0.63	52.28	3.74	No	3.30	4.50	>4	1	>4	0	0.00	0.00	>32	4.75	8.20	17.40	1
59E A	15S	46.9	1.8	45.1	7633009.8	699346.8	11/30/01	15:55:52	1436	14.02	220.84	15.75	14.90	16.27	1.37	51.50	3.67	No	2.47	4.05	>4	1	>4	2	11.42	12.85	1	0.19	15.27	15.85	1 on 3
59F A	15S	40.1	1.1	39.0	7634253.1	700638.0	12/06/01	16:49:17	292	14.00	204.85	14.64	14.32	14.82	0.50	62.34	4.45	No	3.32	4.42	>4	2	>4	4	8.35	13.22	1	0.11	13.54	13.87	1 on 3
60A A	15S	17.4	2.1	15.3	7632266.0	697515.5	11/30/01	16:23:00	1460	14.02	278.28	19.85	19.12	20.24	1.12	49.01	3.50	No	2.95	3.70	>4	1	>4	6	5.05	11.05	35	5.10	2.68	20.12	1 on 3
60B C	5S	31.7	2.1	29.6	7632407.8	697730.7	11/30/01	16:18:31	1457	14.00	282.68	20.20	18.14	21.17	3.02	65.20	4.66	No	2.20	5.37	>4	2	>4	0	0.00	0.00	34	10.61	7.90	20.20	1
60B E	15S	28.9	1.2	27.7	7632394.5	697747.9	12/07/01	17:14:57	658	14.00	182.02	13.01	12.65	13.65	1.00	98.64	7.05	No	6.20	7.95	>4	2	>4	1	11.12	11.85	0	0.00	0.00	0.00	1 on 3
60C C	15S	49.9	2.0	47.9	7633007.9	698358.1	11/30/01	16:12:00	1452	13.98	236.74	16.94	16.82	17.07	0.25	54.12	3.87	No	2.82	4.55	>4-3	1	>4	0	0.00	0.00	3	1.29	13.90	13.95	1

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
60D A	15S	45.2	1.9	43.3	7633504.0	698873.2	11/30/01	16:05:01	1442	14.00	222.59	15.90	15.37	16.00	0.62	43.39	3.10	No	2.60	3.80	>4	2	>4	4	3.15	14.82	0	0.00	0.00	0.00	1 on 3
60E A	15S	36.5	1.2	35.3	7634977.9	700413.7	12/06/01	16:41:57	286	14.02	236.87	16.89	16.44	17.24	0.80	54.93	3.92	No	2.92	4.70	>4	2	>4	3	9.80	11.45	15	1.55	10.39	16.89	1 on 3
61A A	15S	25.9	2.2	23.7	7632781.5	697212.9	11/30/01	16:31:49	1466	14.02	262.24	18.70	18.29	19.17	0.88	39.74	2.83	No	1.70	5.15	>4	1	>4	1	9.22	9.42	62	4.47	7.30	18.70	1 on 3
61B A	15S	42.7	2.3	40.4	7633211.9	697650.2	11/30/01	16:36:46	1472	13.97	263.17	18.84	15.85	19.54	3.70	120.37	8.62	No	6.12	8.37	>4	1	>4	0	0.00	0.00	17	4.44	11.30	18.84	3
61C A	15S	49.0	2.4	46.6	7633920.6	698339.2	11/30/01	16:44:16	1478	13.97	281.06	20.12	17.99	20.97	2.97	66.52	4.76	No	2.55	5.87	>4	1	>4	2	11.65	14.67	10	1.45	13.80	20.12	1 on 3
61D C	15S	15.7	2.0	13.7	7634102.8	698534.5	12/03/01	8:24:31	1510	14.02	113.15	8.07	7.42	8.77	1.35	22.31	1.59	No	0.85	2.27	3-2	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
61E D	15S	41.1	0.4	40.7	7635311.3	699741.8	12/10/01	10:31:48	786	13.97	196.11	14.04	13.42	15.05	1.62	61.97	4.44	No	2.90	6.57	>4	2	>4	1	9.87	10.20	7	2.19	7.90	14.04	1 on 3
62A B	15S	10.0	2.0	8.0	7633294.8	696828.0	12/03/01	8:55:36	1532	14.02	196.48	14.01	13.17	14.67	1.50	56.53	4.03	No	2.72	5.25	>4	1	>4	0	0.00	0.00	4	3.79	12.00	14.10	1
62B A	15S	41.6	2.0	39.6	7633382.6	696906.7	12/03/01	8:48:01	1524	14.05	242.92	17.29	16.52	18.07	1.55	45.43	3.23	No	2.32	4.82	>4	2	>4	0	0.00	0.00	39	9.57	7.30	17.29	2
62C C	5S	61.0	2.0	59.0	7634166.6	697700.6	12/03/01	8:43:20	1521	14.00	292.68	20.91	20.24	21.17	0.92	60.86	4.35	No	3.23	4.88	>4	1	>4	0	0.00	0.00	17	1.19	10.80	20.91	1
62D C	15S	13.4	2.0	11.4	7634583.9	698125.4	12/03/01	8:35:46	1516	14.02	89.48	6.38	5.67	7.22	1.55	89.48	>6.38	Yes	>5.67	>7.22	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
62E A	15S	30.1	1.2	28.9	7635982.5	699592.0	12/06/01	16:28:05	274	13.95	195.60	14.03	13.55	14.47	0.92	51.84	3.72	No	2.60	6.40	>4	2	>4	5	4.00	12.25	0	0.00	0.00	0.00	1 on 3
63A C	15S	25.4	2.0	23.4	7634120.1	696428.2	12/03/01	9:05:52	1540	14.00	257.03	18.37	17.79	18.62	0.83	50.19	3.59	No	2.98	3.95	>4	1	>4	0	0.00	0.00	51	19.86	7.60	18.37	1
63B A	15S	39.8	2.0	37.8	7634380.1	696780.9	12/03/01	9:10:18	1542	14.02	297.68	>21.13	>21.13	>21.13	Ind	55.93	>3.99	No	>3.70	>4.15	>4	2	>4	1	8.77	8.97	29	3.54	11.20	>21.13	3
63B D	15S	36.9	1.3	35.6	7634367.2	696784.3	12/07/01	17:05:37	650	14.00	203.35	14.53	14.10	14.77	0.67	203.35	>14.53	Yes	>14.10	>14.77	>4	2	>4	1	3.27	3.73	0	0.00	0.00	0.00	1 on 3
63C A	15S	66.7	2.0	64.7	7634925.8	697465.7	12/03/01	9:16:06	1548	14.00	255.92	18.29	17.44	18.64	1.20	47.73	3.41	No	2.30	4.47	>4	1	>4	0	0.00	0.00	6	0.37	14.50	15.40	1
63D A	15S	25.9	2.0	23.9	7635083.4	697667.0	12/03/01	9:21:24	1554	14.02	184.42	13.15	12.47	13.60	1.12	41.04	2.93	No	2.35	3.05	>4-3	1	>4	4	7.40	12.55	0	0.00	0.00	0.00	1 on 3
63E A	15S	28.0	1.2	26.8	7636168.2	699077.9	12/06/01	16:21:06	268	13.95	283.14	20.30	19.99	20.79	0.80	67.35	4.83	No	4.05	5.53	>4	2	>4	5	10.40	19.02	0	0.00	0.00	0.00	1 on 3
64A A	5S	34.6	2.0	32.6	7634691.8	696088.8	12/03/01	9:43:09	1577	14.02	297.50	>21.22	>21.22	>21.22	Ind	64.25	>4.58	No	>4.20	>5.30	>4	2	>4	0	0.00	0.00	34	3.11	6.80	>21.22	3
64A D	15S	33.4	1.3	32.1	7634704.3	696103.3	12/07/01	16:55:24	638	14.00	194.65	13.91	13.07	14.62	1.55	82.80	5.92	No	4.90	7.35	>4	2	>4	1	10.25	10.57	3	0.42	10.55	12.62	1 on 3
64B B	5S	49.4	2.0	47.4	7635096.3	696675.4	12/03/01	9:38:04	1573	14.00	296.63	>21.19	>21.19	>21.19	Ind	97.70	>6.98	No	>6.37	>7.53	>4	1	>4	0	0.00	0.00	30	2.73	15.20	>21.19	1
64B E	15S	46.9	1.3	45.6	7635100.4	696670.1	12/07/01	17:00:23	646	14.02	176.05	12.56	11.72	14.00	2.27	176.05	>12.56	Yes	>11.72	>14.00	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
64C B	15S	47.3	2.0	45.3	7635494.3	697222.0	12/03/01	9:32:26	1568	14.02	206.11	14.70	13.82	15.57	1.75	46.58	3.32	No	1.50	4.90	>4/3-2	0	>4	1	6.72	9.30	0	0.00	0.00	0.00	1 on 3
64D B	15S	10.0	2.0	8.0	7635560.7	697349.9	12/03/01	9:28:19	1562	14.05	139.24	9.91	9.12	10.82	1.70	Ind	Ind	No	Ind	Ind	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
64E B	15S	21.2	1.2	20.0	7636767.9	699099.9	12/06/01	16:15:40	264	13.95	219.20	15.72	15.57	16.04	0.47	46.60	46.12	No	2.20	4.07	4-3/>4	2	>4	2	11.30	13.17	11	1.70	12.87	15.72	1 on 3
65A A	15S	19.4	2.0	17.4	7635215.7	695719.3	12/03/01	9:51:11	1584	14.02	249.54	17.80	17.24	18.04	0.80	58.77	4.19	No	3.42	4.28	>4	1	>4	2	1.40	10.17	4	0.73	14.00	17.80	1 on 3
65B C	5S	27.4	1.9	25.5	7635359.6	695950.8	12/03/01	9:57:24	1593	14.00	297.33	>21.14	>21.14	>21.14	Ind	111.68	>7.98	No	>6.72	>8.90	>4	2	>4	0	0.00	0.00	23	4.42	10.40	>21.14	1
65B E	15S	25.1	1.3	23.8	7635355.6	695958.2	12/07/01	16:46:59	634	14.00	188.34	13.46	13.22	13.72	0.50	113.83	8.13	No	7.87	8.70	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
65C A	15S	53.7	1.9	51.8	7635747.1	696629.0	12/03/01	10:02:35	1596	14.02	171.10	12.20	11.50	12.75	1.25	1.66	0.12	No	0.00	0.23	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
65D C	15S	13.2	1.9	11.3	7636006.2	697040.0	12/03/01	10:10:29	1606	14.00	100.31	7.17	6.90	7.35	0.45	Ind	Ind	No	Ind	Ind	3-2	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
66A A	15S	29.8	1.8	28.0	7635789.8	695475.0	12/03/01	10:40:02	1638	14.02	238.95	17.04	16.37	17.34	0.97	71.40	5.09	No	3.52	6.37	4-3/>4	1	>4	0	0.00	0.00	22	3.56	8.90	17.04	2->3
66B C	5S	23.2	1.8	21.4	7635896.6	695657.2	12/03/01	10:36:11	1635	14.00	274.06	19.58	18.52	20.49	1.97	159.94	11.43	No	10.97	12.47	>4	1	>4	0	0.00	0.00	13	2.54	15.20	19.58	1->2
66C C	5S	54.7	1.8	52.9	7636163.5	696086.7	12/03/01	10:31:12	1629	14.02	297.33	>21.21	>21.21	>21.21	Ind	136.66	>9.75	No	>8.30	>12.57	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	3
66C E	15S	51.9	1.3	50.6	7636169.0	696080.3	12/07/01	16:40:21	628	13.97	137.17	9.82	9.72	10.07	0.35	137.17	>9.82	Yes	>9.72	>10.07	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
66D B	15S	46.3	1.9	44.4	7636463.2	696563.4	12/03/01	10:26:12	1622	14.02	210.37	15.00	14.70	15.32	0.62	57.23	4.08	No	2.97	4.87	>4	2	>4	2	8.00	9.17	0	0.00	0.00	0.00	1 on 3
66E B	15S	25.4	1.9	23.5	7636548.2	696701.5	12/03/01	10:21:11	1616	14.00	189.46	13.54	13.07	14.00	0.92	46.68	3.34	No	2.25	5.27	>4/4-3/>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	2 --> 3
66F A	15S	9.0	1.9	7.1	7636604.3	696780.4	12/03/01	10:14:31	1608	14.02	58.83	4.20	3.65	4.80	1.15	9.53	0.68	No	0.04	1.53	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
67A B	15S	27.9	1.8	26.1	7636368.8	695130.8	12/03/01	10:47:19	1646	14.00	124.59	8.90	8.67	9.15	0.47	48.28	3.45	No	1.90	4.32	3-2	1	>4	2	2.72	4.32	0	0.00	0.00	0.00	3
67A C	15S	28.5	1.8	26.7	7636368.5	695134.4	12/03/01	10:48:06	1648	14.02	150.35	10.72	10.75	10.97	0.22	52.03	3.71	No	2.72	4.42	4-3/>4	1	>4	2	5.37	8.38	0	0.00	0.00	0.00	3
67B A	5S	21.7	1.8	19.9	7636478.8	695290.2	12/03/01	10:50:32	1649	14.02	298.20	>21.27	>21.27	>21.27	Ind	163.15	>11.64	No	>10.92	>12.52	>4	2	>4	0	0.00	0.00	25	3.45	13.70	>21.27	1
67B E	15S	19.6	1.4	18.2	7636459.8	695311.9	12/07/01	16:33:15	622	14.00	264.17	18.88	18.64	19.19	0.55	264.17	>18.88	Yes	>18.64	>19.19	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
67C A	5S	44.4	1.7	42.7	7636598.9	695511.0	12/03/01	11:01:00	1661	14.05	299.53	>21.33	>21.33	>21.33	Ind	182.35	>12.98	No	>12.10	>15.40	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
67C F	5S	42.1	1.4	40.7	7636613.2	695512.2	12/07/01	16:28:19	617	13.97	204.14	14.61	13.70	15.55	1.85	204.14	>14.61	Yes	>13.70	>15.55	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
67D C	15S	82.5	1.7	80.8	7636871.1	695972.8	12/03/01	11:10:14	1672	14.00	243.46	17.40	16.59	17.79	1.20	14.99	1.07	No	0.07	3.82	>4	1	>4	0	0.00	0.00	12	1.34	8.80	17.40	1
67E B	15S	20.2	1.7	18.5	7637105.8	696347.7	12/03/01	11:16:13	1676	14.00	170.95	12.21	10.25	13.05	2.80	71.09	5.08	No	2.58	5.12	>4-3	1	>4	1	2.13	4.79	0	0.00	0.00	0.00	1 on 3
68A A	5S	24.7	1.6	23.1	7636930.4	694806.1	12/03/01	11:44:26	1705	14.02	265.36	18.93	18.44	19.17	0.72	63.77	4.55	No	4.22	4.80	>4	1	>4	0	0.00	0.00	17	6.37	11.20	18.93	1
68B B	5S	27.4	1.6	25.8	7636980.2	694877.2	12/03/01	11:39:19	1699	14.02	298.56	>21.29	>21.29	>21.29	Ind	119.94	>8.55	No	>7.62	>9.40	>4	2	>4	0	0.00	0.00	31	3.02	14.30	>21.29	1
68B F	15S	24.4	1.5	22.9	7636984.4	694867.3	12/07/01	16:11:33	604	13.97	222.28	15.91	15.85	16.02	0.17	191.22	13.69	No	11.80	13.82	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
68C A	5S	61.0	1.6	59.4	7637291.4	695384.0	12/03/01	11:31:23	1691	14.02	296.80	>21.17	>21.17	>21.17	Ind	Ind	Ind	No	Ind	Ind	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
68C D	15S	59.2	1.4	57.8	7637284.3	695388.4	12/07/01	16:18:41	608	14.00	126.19	9.02	8.12	9.27	1.15	126.19	>9.02	Yes	>8.12	>9.27	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
68D A	15S	46.5	1.7	44.8	7637581.6	695884.7	12/03/01	11:26:12	1686	14.00	247.49	17.68	17.37	18.02	0.65	48.43	3.46	No	2.63	4.20	>4-3	1	>4	1	9.57	9.92	2	0.24	17.40	17.65	1 on 3
68E A	15S	11.0	1.7	9.3	7637668.6	696036.2	12/03/01	11:21:05	1680	14.02	27.54	1.96	1.47	2.87	1.40	27.54	>1.96	Yes	>1.47	>2.87	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
69A B	15S	10.7	1.6	9.1	7637333.3	694184.6	12/03/01	11:52:48	1714	13.97	95.08	6.81	5.42	7.77	2.35	58.40	4.18	No	3.22	5.90	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
69B A	15S	23.1	1.5	21.6	7637424.9	694331.8	12/03/01	11:56:57	1718	14.02	229.37	16.36	15.90	16.64	0.75	44.69	3.19	No	1.62	3.72	>4	1	>4	2	7.57	9.60	17	3.75	8.90	16.36	1 on 3
69C A	15S	34.2	1.3	32.9	7637570.9	694542.7	12/03/01	13:01:16	1726	14.00	218.97	15.65	15.25	16.32	1.08	69.24	4.95	No	4.40	5.17	>4	2	>4	1	6.72	7.13	9	1.06	11.60	15.65	1 on 3
69D C	15S	80.8	1.2	79.6	7638003.3	695258.8	12/03/01	13:10:25	1736	14.02	290.36	20.71	20.44	21.04	0.60	59.77	4.26	No	3.67	4.92	4-3/>4	1	>4	0	0.00	0.00	11	3.26	16.80	20.71	1
69E A	15S	16.3	1.2	15.1	7638252.1	695647.1	12/03/01	13:14:18	1738	14.05	272.31	19.39	19.09	19.62	0.52	76.83	5.47	No	4.00	6.50	>4	1	>4	1	0.50	0.70	3	0.42	17.29	19.19	2 -> 3
70A A	5S	45.7	1.1	44.6	7638623.9	693834.5	12/03/01	13:49:31	1761	14.05	299.27	>21.31	>21.31	>21.31	Ind	106.69	>7.60	No	>7.47	>10.57	>4	2	>4	0	0.00	0.00	12	8.43	14.70	>21.31	1
70A E	15S	44.4	1.5	42.9	7638625.6	693827.2	12/07/01	16:03:00	598	14.00	182.01	13.00	12.20	15.15	2.95	182.01	>13.00	Yes	>12.20	>15.15	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
70B C	5S	49.1	1.1	48.0	7638904.0	694140.1	12/03/01	13:45:36	1759	14.02	295.65	>21.19	>21.19	>21.19	Ind	222.85	>15.89	No	>14.05	>18.62	>4	1	>4	1	10.62	10.87	0	0.00	0.00	0.00	3
70B E	15S	47.8	1.5	46.3	7638896.8	694150.1	12/07/01	15:56:56	592	13.97	155.20	11.11	10.15	11.70	1.55	155.20	>11.11	Yes	>10.15	>11.70	4-3/>4	1	>4	1	6.35	6.80	0	0.00	0.00	0.00	1 on 3
70C A	15S	34.4	1.2	33.2	7639608.9	694894.7	12/03/01	13:30:22	1750	14.00	182.64	13.05	12.62	13.75	1.12	51.09	3.65	No	2.47	4.55	4-3/>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
70D A	15S	15.2	1.2	14.0	7639668.0	694972.9	12/03/01	13:23:44	1744	14.02	14.38	1.03	0.47	1.55	1.08	Ind	Ind	No	Ind	Ind	>4	-3	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
71A B	15S	49.2	1.1	48.1	7639672.0	693012.7	12/03/01	14:05:39	1776	14.00	201.21	14.38	13.87	14.82	0.95	21.83	1.56	No	0.25	2.98	>4	2	>4	4	4.27	12.50	0	0.00	0.00	0.00	3
71B C	5S	49.0	1.1	47.9	7640286.8	693576.4	12/03/01	14:12:08	1783	14.02	298.39	>21.28	>21.28	>21.28	Ind	153.82	>10.97	No	>9.05	>12.80	>4	1	>4	2	15.00	16.32	1	0.07	20.64	21.12	3
71B G	5S	46.6	1.5	45.1	7640266.2	693563.8	12/07/01	15:49:47	587	13.97	164.25	11.76	11.30	12.10	0.80	138.51	9.91	No	9.07	10.30	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
71C B	15S	13.8	1.1	12.7	7640409.2	693714.1	12/03/01	14:20:20	1788	14.00	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
72A C	15S	41.6	1.0	40.6	7640265.1	692047.7	12/03/01	14:50:20	1803	14.00	47.08	3.36	3.15	3.37	0.22	30.10	2.15	No	1.63	3.26	3-2	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
72B A	5S	61.3	1.1	60.2	7640747.7	692256.4	12/03/01	14:41:48	1797	14.00	287.40	20.53	19.72	20.94	1.22	287.40	20.53	Yes	19.72	20.94	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	3

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
72C B	15S	24.8	1.1	23.7	7641133.1	692579.4	12/03/01	14:35:02	1794	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
73A C	15S	16.5	1.0	15.5	7641127.6	690778.6	12/03/01	14:59:41	1814	14.02	205.72	14.67	14.10	14.82	0.72	60.31	4.30	No	2.60	5.30	>4	2	>4	1	8.88	9.50	3	0.18	12.22	14.55	1 on 3
73B C	5S	34.4	1.0	33.4	7641216.7	690865.6	12/03/01	15:05:48	1819	14.02	298.65	>21.30	>21.30	>21.30	Ind	170.09	>12.13	No	>9.75	>15.17	>4	2	>4	0	0.00	0.00	4	0.51	16.30	17.80	1
73B F	5S	34.5	1.6	32.9	7641204.3	690868.1	12/07/01	15:34:21	579	14.00	200.72	14.34	14.07	15.00	0.92	200.72	>14.34	Yes	>14.07	>15.00	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
73C A	15S	52.2	1.0	51.2	7641744.0	691382.2	12/03/01	15:10:33	1822	14.00	107.02	7.65	7.00	8.12	1.13	23.00	1.64	No	0.70	3.35	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
73D A	15S	20.9	0.9	20.0	7641940.4	691549.2	12/03/01	15:15:48	1828	14.05	271.12	19.30	18.29	20.12	1.82	134.14	9.55	No	9.20	10.82	>4/4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1 on 3
73D C	5S	21.2	0.9	20.3	7641941.3	691544.1	12/03/01	15:17:00	1831	14.02	270.38	19.28	18.12	20.57	2.45	122.42	8.73	No	7.02	10.40	>4/4-3	1	>4	3	10.20	16.07	0	0.00	0.00	0.00	1 on 3
74A E	5S	30.8	0.9	29.9	7642102.5	689888.8	12/03/01	15:43:51	1861	14.05	298.47	>21.15	>21.15	>21.15	Ind	210.03	>14.95	No	>12.55	>16.30	>4	2	>4	0	0.00	0.00	6	1.66	19.00	>21.15	1
74A F	15S	27.1	1.6	25.5	7642092.7	689887.7	12/07/01	15:24:32	570	14.00	254.11	18.16	17.52	18.42	0.90	237.25	16.95	No	16.00	17.64	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
74B C	5S	59.3	0.9	58.4	7642309.2	690111.0	12/03/01	15:37:08	1851	14.02	295.92	>21.19	>21.19	>21.19	Ind	295.92	>21.19	Yes	>21.19	>21.19	4-3/>4	0	>4	1	19.94	20.72	0	0.00	0.00	0.00	3
74B E	15S	58.2	1.7	56.5	7642317.2	690104.8	12/07/01	15:18:12	566	14.00	122.06	8.72	7.72	9.75	2.02	Ind	Ind	No	Ind	Ind	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
74C B	15S	49.0	0.9	48.1	7642661.5	690416.9	12/03/01	15:30:09	1842	13.97	86.11	6.16	5.60	6.55	0.95	22.70	1.62	No	1.50	2.10	3-2/>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
74D B	15S	19.2	0.9	18.3	7642758.5	690494.7	12/03/01	15:23:46	1836	14.00	179.61	12.83	12.05	13.27	1.22	179.61	>12.83	Yes	>12.05	>13.27	>4	2	>4	3	8.40	10.92	0	0.00	0.00	0.00	3
75A D	15S	14.2	0.9	13.3	7642986.6	688954.6	12/03/01	15:53:01	1870	14.00	260.90	18.64	18.12	18.87	0.75	127.60	9.12	No	8.62	9.65	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
75B C	15S	34.2	0.9	33.3	7643062.4	689037.0	12/03/01	16:32:01	1910	14.05	241.51	17.19	16.44	17.64	1.20	121.95	8.68	No	7.27	10.37	>4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
75C B	15S	53.0	1.0	52.0	7643410.2	689363.1	12/03/01	16:40:32	1914	14.02	31.56	2.25	1.63	3.11	1.48	Ind	Ind	No	Ind	Ind	-3 - -4	-5	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
75D D	15S	46.9	1.0	45.9	7643700.5	689622.0	12/03/01	16:50:43	1924	13.97	47.24	3.38	3.25	3.55	0.30	47.24	>3.38	Yes	>3.25	>3.55	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
75E E	15S	26.0	1.1	24.9	7643768.0	689665.6	12/03/01	17:00:01	1934	14.02	91.17	6.50	4.45	7.57	3.12	91.17	>6.50	Yes	>4.45	>7.57	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
76A A	5S	20.5	1.2	19.3	7643960.5	688085.1	12/03/01	17:08:37	1935	14.00	290.11	20.73	19.92	21.17	1.25	162.47	11.61	No	11.05	12.65	4-3/>4/4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
76B A	15S	65.1	1.9	63.2	7644630.8	688651.6	12/04/01	8:36:47	1964	14.00	38.52	2.75	1.60	4.77	3.17	Ind	Ind	No	0.00	1.62	3-2	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
76C A	15S	29.4	1.9	27.5	7644849.1	688535.6	12/04/01	8:45:13	1970	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
77A B	15S	43.2	2.0	41.2	7644852.5	687153.2	12/04/01	9:18:53	1996	13.97	157.89	11.30	10.47	12.12	1.65	48.57	3.48	No	2.02	4.30	4-3	1	>4	1	2.45	3.43	4	6.10	6.20	9.70	1 on 3
77B A	15S	53.3	2.0	51.3	7644886.7	687194.3	12/04/01	9:12:04	1988	14.05	180.40	12.84	12.60	13.07	0.47	Ind	Ind	No	Ind	Ind	4-3/>4	1	>4	0	0.00	0.00	29	6.77	2.80	12.84	1
77B C	15S	53.1	2.0	51.1	7644888.9	687193.6	12/04/01	9:13:27	1992	14.05	159.63	11.37	9.95	12.85	2.90	24.20	1.72	No	0.27	4.00	4-3/>4	-2	>4	2	0.78	9.95	6	1.09	6.10	11.05	1 on 3
77C A	15S	55.2	2.0	53.2	7645134.8	687377.5	12/04/01	9:05:43	1982	14.05	28.70	2.04	0.50	2.50	2.00	Ind	Ind	No	Ind	Ind	0 - -1	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
77D C	15S	33.8	2.0	31.8	7645399.7	687574.4	12/04/01	8:59:59	1980	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
78A A	15S	16.2	2.0	14.2	7645662.8	686071.9	12/04/01	9:30:16	2000	14.05	250.54	17.84	17.34	18.44	1.10	229.73	16.36	No	15.67	16.92	>4	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
78B A	15S	56.0	2.0	54.0	7645812.1	686188.5	12/04/01	9:42:01	2006	13.97	43.04	3.08	2.60	4.22	1.62	Ind	Ind	No	Ind	Ind	-2 - -3	-3	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
78C A	15S	71.7	2.0	69.7	7645938.6	686274.9	12/04/01	9:48:36	2012	13.97	57.82	4.14	3.30	5.07	1.77	Ind	Ind	No	Ind	Ind	2-1	-1	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
78D B	15S	51.4	2.0	49.4	7646173.2	686428.7	12/04/01	9:57:19	2020	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	-3 - -4	-5	>4	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
79A A	15S	36.6	1.9	34.7	7646158.0	684955.2	12/04/01	10:58:31	2046	14.05	80.78	5.75	3.77	6.55	2.77	80.78	>5.75	Yes	>3.77	>6.55	4-3/>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
79A C	15S	36.3	1.9	34.4	7646157.0	684957.0	12/04/01	11:00:24	2050	14.00	270.24	19.31	17.74	20.19	2.45	138.79	9.92	No	7.90	10.22	4-3/>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
79B C	15S	46.5	1.9	44.6	7646318.1	685046.4	12/04/01	10:54:14	2044	13.95	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
79C B	15S	36.2	2.0	34.2	7647004.8	685371.2	12/04/01	10:30:42	2030	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
79D B	15S	20.3	2.0	18.3	7647060.6	685395.9	12/04/01	10:36:34	2036	13.95	3.65	0.26	0.00	1.53	1.53	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
80A C	5S	37.2	1.9	35.3	7646176.9	683863.1	12/04/01	11:04:27	2055	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
80B B	5S	39.4	1.9	37.5	7646238.8	683875.1	12/04/01	11:14:16	2059	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
80C B	15S	54.5	1.8	52.7	7646703.6	683818.4	12/04/01	11:21:49	2066	14.00	86.49	6.18	4.75	8.17	3.42	17.62	1.26	No	0.63	1.81	3-2/4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
80D B	15S	29.6	1.8	27.8	7646910.7	683766.7	12/04/01	11:26:54	2072	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
81A A	15S	38.0	1.7	36.3	7645765.1	682709.6	12/04/01	11:53:45	2094	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
81B C	15S	41.9	1.7	40.2	7645807.1	682696.6	12/04/01	11:50:05	2092	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
81C A	15S	41.2	1.8	39.4	7646481.4	682508.7	12/04/01	11:42:13	2082	14.00	56.57	4.04	3.55	4.62	1.07	Ind	Ind	No	Ind	Ind	-1 - -2	-3	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
81D B	15S	29.9	1.8	28.1	7646569.5	682477.1	12/04/01	11:37:18	2078	14.02	8.00	0.57	0.00	1.40	1.40	Ind	Ind	No	Ind	Ind	2-1	-1	>4	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
82A A	15S	40.9	1.6	39.3	7645304.2	681479.9	12/04/01	12:28:22	2118	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
82B A	15S	40.5	1.6	38.9	7645642.6	681400.1	12/04/01	12:23:26	2112	14.02	37.64	2.68	1.85	3.67	1.82	Ind	Ind	No	0.00	0.93	1-0	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
82C A	15S	30.9	1.7	29.2	7646254.9	681236.3	12/04/01	12:16:55	2106	14.02	169.02	12.06	11.30	12.65	1.35	40.63	2.90	No	1.83	5.42	4-3/>4	2	>4	2	4.75	5.50	0	0.00	0.00	0.00	1 on 3
82D C	15S	9.3	1.7	7.6	7646298.9	681210.9	12/04/01	12:12:10	2104	13.97	242.64	17.37	17.07	17.74	0.67	101.23	7.25	No	6.52	8.50	>4/4-3/>4	2	>4	4	13.37	16.17	0	0.00	0.00	0.00	1 on 3
83A A	15S	11.2	1.2	10.0	7645065.3	679881.1	12/04/01	14:18:24	2156	14.00	287.46	20.54	19.92	20.99	1.07	88.71	6.34	No	5.10	7.00	>4	1	>4	2	15.22	17.52	0	0.00	0.00	0.00	1 on 3
83B B	15S	14.7	1.2	13.5	7645190.1	679601.2	12/04/01	14:09:40	2152	14.00	102.16	7.30	6.10	8.15	2.05	57.61	4.12	No	3.25	5.50	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
83C A	15S	15.4	1.3	14.1	7645316.0	679383.8	12/04/01	14:01:14	2144	13.97	134.03	9.59	8.95	9.90	0.95	73.02	5.23	No	5.05	6.22	>4-3	-2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
83D B	15S	31.3	1.3	30.0	7645364.1	679849.2	12/04/01	13:53:51	2140	13.97	130.59	9.35	8.22	9.85	1.62	29.50	2.11	No	0.83	3.40	4-3/>4	-2	>4	3	5.67	7.47	0	0.00	0.00	0.00	1 on 3
83F C	15S	23.4	1.3	22.1	7646295.3	680169.8	12/04/01	13:46:59	2136	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
83G C	15S	17.8	1.3	16.5	7646345.9	680185.1	12/04/01	13:41:02	2130	13.97	134.67	9.64	9.15	10.00	0.85	36.36	2.60	No	1.50	3.83	4-3	0	>4	2	0.55	7.47	0	0.00	0.00	0.00	1 on 3
84A A	15S	11.7	1.2	10.5	7645534.8	678536.8	12/04/01	14:31:14	2162	14.02	37.05	2.64	2.37	3.12	0.75	37.05	>2.64	Yes	>2.37	>3.12	>4	3	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
84B A	15S	17.5	1.2	16.3	7645740.8	678646.4	12/04/01	14:39:09	2168	14.02	157.14	11.21	10.20	11.67	1.47	58.11	4.14	No	2.45	5.25	4-3/>4	1	>4	2	9.47	10.02	0	0.00	0.00	0.00	1 on 3
84C A	15S	45.4	1.1	44.3	7646304.2	678785.1	12/04/01	14:46:24	2174	14.00	23.12	1.65	1.18	2.03	0.85	Ind	Ind	No	Ind	Ind	-1 - -2	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
84D C	15S	23.1	1.1	22.0	7646610.4	678882.6	12/04/01	14:56:21	2184	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
85A B	5S	16.6	1.0	15.6	7646059.0	677329.6	12/04/01	15:28:24	2207	14.02	296.36	>21.17	>21.17	>21.17	Ind	135.08	>9.63	No	>7.37	>11.80	>4	2	>4	2	13.35	15.37	20	1.60	11.90	>21.17	3
85A E	15S	16.7	1.8	14.9	7646075.9	677319.7	12/07/01	14:23:16	554	13.97	226.61	16.22	15.52	16.62	1.10	166.32	11.91	No	11.30	13.90	>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
85B A	15S	44.5	1.1	43.4	7646591.1	677511.9	12/04/01	15:21:20	2200	14.05	25.65	1.83	0.00	4.20	4.20	Ind	Ind	No	Ind	Ind	-5 - -6	-5	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
85C B	15S	42.1	1.1	41.0	7647080.7	677681.1	12/04/01	15:15:30	2196	13.97	132.77	9.50	8.82	9.75	0.92	36.86	2.64	No	1.20	3.80	4-3	0	>4	1	5.90	8.03	0	0.00	0.00	0.00	1 on 3
85D D	15S	21.7	1.1	20.6	7647178.5	677702.4	12/04/01	15:09:00	2192	14.02	120.19	8.57	8.02	8.92	0.90	41.55	2.96	No	2.15	3.85	4-3	0	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
86A C	15S	21.1	1.0	20.1	7646472.5	676121.4	12/04/01	15:43:31	2216	14.05	44.49	3.17	2.92	3.55	0.62	44.49	>3.17	Yes	>2.92	>3.55	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
86B C	15S	36.9	1.0	35.9	7646592.4	676086.1	12/04/01	15:50:22	2224	14.02	44.73	3.19	2.77	3.55	0.77	Ind	Ind	No	Ind	Ind	-3 - -4	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
86C B	15S	23.1	1.0	22.1	7647689.7	676205.5	12/04/01	16:03:11	2234	14.02	42.70	3.05	0.75	6.97	6.22	27.23	1.94	No	0.00	5.30	-2 - -3	-3	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
86C C	15S	23.0	1.0	22.0	7647687.0	676216.4	12/04/01	16:03:54	2236	14.02	69.89	4.98	4.62	5.37	0.75	48.52	3.46	No	2.82	3.85	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
86D C	15S	8.2	1.0	7.2	7647845.2	676197.0	12/04/01	15:58:37	2230	14.02	113.43	8.09	7.30	8.67	1.37	48.17	3.44	No	2.40	4.52	3-2	0	>4	1	4.33	4.85	0	0.00	0.00	0.00	3
87A C	15S	18.4	0.9	17.5	7646415.9	675023.3	12/04/01	16:43:46	2266	13.95	89.55	6.42	5.63	7.25	1.62	89.55	>6.42	Yes	>5.63	>7.25	-2 - -3	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
87B C	15S	21.9	0.9	21.0	7646962.9	674938.1	12/04/01	16:37:14	2260	14.02	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind

Station/ Rep	Interval	Raw Depth (ft)	Predicted Tide (ft)	Depth MLLW (ft)	Easting	Northing	Date	Time	Frame	CAL	Penetration Area (sq.cm)	Penetration Mean (cm)	Penetration Minimum (cm)	Penetration Maximum (cm)	Boundary Roughness (cm)	RPD AREA	RPD Mean (cm)	RPD > Penetration	RPD Minimum (cm)	RPD Maximum (cm)	Grain Size Major Mode (phi)	Grain Size Maximum (phi)	Grain Size Minimum (phi)	Number of Voids	Minimum Void Depth (cm)	Maximum Void Depth (cm)	Methane Voids (#)	Methane Area (cm.sq)	Methane Minimum Depth (cm)	Methane Maximum Depth (cm)	Infaunal Succ. Stage
87C C	15S	5.5	1.0	4.5	7647517.5	674792.0	12/04/01	16:28:49	2254	14.02	48.47	3.46	2.82	3.77	0.95	48.47	>3.46	Yes	>2.82	>3.77	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
87D C	15S	15.8	1.0	14.8	7647619.2	674777.2	12/04/01	16:19:31	2248	14.00	165.52	11.83	11.37	12.57	1.20	56.42	4.03	No	2.93	4.72	4-3/>4	2	>4	1	10.10	11.30	0	0.00	0.00	0.00	1 on 3
87E C	15S	5.6	1.0	4.6	7648152.3	674655.8	12/04/01	16:12:42	2242	13.97	178.56	12.78	10.72	13.15	2.42	46.90	3.36	No	2.35	3.92	4-3	1	>4	1	0.55	0.78	0	0.00	0.00	0.00	2
88A C	15S	26.0	0.9	25.1	7646176.5	673754.7	12/04/01	16:51:22	2272	13.95	26.91	1.93	0.30	3.32	3.02	26.91	>1.93	Yes	>0.00	>3.35	>4	-1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
88B A	15S	52.3	0.9	51.4	7646639.2	673586.7	12/04/01	16:58:09	2274	14.00	54.07	3.86	3.20	4.83	1.63	Ind	Ind	No	Ind	Ind	-3 - -4	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
88C A	15S	17.6	0.9	16.7	7646734.6	673579.0	12/04/01	17:06:40	2280	14.00	75.60	5.40	4.70	5.92	1.22	75.60	>5.40	Yes	>4.70	>5.92	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
88C C	15S	19.5	0.9	18.6	7646721.8	673564.4	12/04/01	17:08:27	2284	14.02	57.96	4.13	3.70	4.67	0.97	Ind	Ind	No	Ind	Ind	-3 - -4	-5	>4	0	0.00	0.00	0	0.00	0.00	0.00	Ind
88E B	15S	14.0	1.9	12.1	7648502.4	672988.4	12/07/01	14:08:19	548	14.02	235.68	16.81	16.00	17.54	1.55	133.82	9.54	No	8.40	10.70	>4	2	>4	4	9.55	14.87	0	0.00	0.00	0.00	1 on 3
88E C	5S	16.6	1.9	14.7	7648499.9	673002.9	12/07/01	14:10:33	549	13.97	222.96	15.96	15.42	16.79	1.37	100.07	7.16	No	5.27	8.80	>4-3	1	>4	3	10.58	11.80	0	0.00	0.00	0.00	1 on 3
89A B	15S	16.4	0.6	15.8	7645702.7	672506.2	12/07/01	9:06:50	366	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
89B C	15S	31.4	0.7	30.7	7645948.0	672497.7	12/07/01	9:14:42	374	14.00	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
89C B	15S	15.9	0.8	15.1	7646370.8	672405.5	12/07/01	9:22:01	378	13.97	5.54	0.00	1.35	Ind	Ind	Ind	Ind	No	Ind	Ind	-2 - -3	-4	>4	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
89H A	15S	20.9	2.0	18.9	7649167.8	671941.5	12/07/01	13:40:51	538	13.97	261.21	18.70	17.04	20.49	3.45	Ind	Ind	No	Ind	Ind	4-3	1	>4	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
89H D	5S	17.7	1.9	15.8	7649166.4	671930.5	12/07/01	13:59:13	543	13.97	>21.22	>21.22	>21.22	>21.22	Ind	>21.22	>21.22	Yes	>21.22	>21.22	4-3/>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
90A A	15S	7.0	1.1	5.9	7645133.5	671171.9	12/07/01	9:48:24	394	14.00	191.42	13.68	13.35	13.87	0.52	28.24	2.02	No	1.27	2.52	>4	1	>4	6	1.07	7.85	1	0.06	5.10	14.82	1 on 3
90A B	5S	6.9	1.1	5.8	7645132.8	671172.0	12/07/01	9:49:12	395	14.00	204.64	14.62	14.22	14.90	0.67	33.46	2.39	No	1.80	2.93	>4	1	>4	1	5.30	6.53	66	4.33	4.82	14.62	1 on 3
90B C	15S	57.1	1.0	56.1	7645856.9	671176.8	12/07/01	9:42:28	391	14.00	47.63	3.40	2.52	3.85	1.32	Ind	Ind	No	Ind	Ind	4-3	3	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
90C C	15S	17.2	0.9	16.3	7646143.5	671149.1	12/07/01	9:35:30	386	13.97	172.29	12.33	11.62	13.12	1.50	172.29	>12.33	Yes	>11.62	>13.12	4-3/>4	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
90H C	5S	24.7	2.0	22.7	7649924.8	671087.0	12/07/01	13:43:05	535	14.00	193.55	13.83	13.57	14.12	0.55	29.69	2.12	No	1.37	2.52	>4	1	>4	1	3.67	3.87	0	0.00	0.00	0.00	1 on 3
91A C	5S	12.4	1.2	11.2	7645177.5	669786.5	12/07/01	9:57:48	403	14.00	141.70	10.12	8.62	12.10	3.47	68.04	4.86	No	1.07	9.40	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
91B A	15S	43.8	1.3	42.5	7645427.6	669824.7	12/07/01	10:05:12	406	14.00	162.26	11.59	11.10	11.85	0.75	108.94	7.78	No	5.17	9.55	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
91C B	15S	8.4	1.4	7.0	7646374.5	669902.6	12/07/01	10:12:21	414	14.02	158.63	11.31	10.57	11.65	1.07	19.20	1.37	No	0.90	2.57	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
91G A	15S	10.6	2.0	8.6	7649529.6	670220.4	12/07/01	13:33:34	526	13.97	119.12	8.53	8.17	8.72	0.55	63.99	4.58	No	4.10	5.30	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
92A B	5S	21.0	1.9	19.1	7645545.3	668492.4	12/07/01	10:56:32	439	14.00	289.64	20.70	19.84	20.94	1.10	123.61	8.83	No	6.02	10.87	>4	1	>4	0	0.00	0.00	3	0.35	18.12	20.70	1
92B B	15S	19.3	1.8	17.5	7646297.6	668613.3	12/07/01	10:50:11	434	14.00	26.49	1.89	1.50	2.15	0.65	Ind	Ind	No	Ind	Ind	-2 - -3	-4	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
92C B	5S	20.5	1.6	18.9	7646793.4	669174.0	12/07/01	10:30:44	419	14.02	251.11	17.91	16.97	18.44	1.47	192.49	13.73	No	11.47	14.92	>4	1	>4	2	1.27	14.62	0	0.00	0.00	0.00	1 on 3
92D A	15S	39.5	1.7	37.8	7647087.6	668734.4	12/07/01	10:38:35	426	14.02	222.45	15.87	15.47	15.92	0.45	157.96	11.27	No	10.35	13.10	>4	1	>4	1	14.15	14.40	0	0.00	0.00	0.00	1 on 3
92F A	15S	8.5	2.0	6.5	7648700.0	668970.0	12/07/01	13:23:06	520	14.00	70.65	5.05	4.25	5.85	1.60	70.65	>5.05	Yes	>4.25	>5.85	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
92G B	15S	14.2	2.0	12.2	7649134.6	669055.1	12/07/01	13:17:02	516	14.00	74.31	5.31	4.55	6.85	2.30	74.31	>5.31	Yes	>4.55	>6.85	4-3	2	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
92H A	15S	16.1	2.1	14.0	7649389.2	669086.7	12/07/01	13:10:25	508	14.05	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
93A B	5S	3.9	2.0	1.9	7645913.2	667247.9	12/07/01	11:17:38	451	14.02	137.18	9.78	9.12	10.10	0.97	90.43	6.45	No	4.85	8.05	>4	3	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93B A	15S	8.5	2.0	6.5	7646024.6	667271.4	12/07/01	11:22:52	458	14.05	285.92	20.36	19.89	20.74	0.85	164.65	11.72	No	10.85	12.62	>4	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93C A	15S	34.5	2.1	32.4	7646929.6	667372.1	12/07/01	11:35:24	466	14.02	161.83	11.54	11.05	12.12	1.07	70.75	5.05	No	1.75	7.70	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	3
93D B	15S	4.4	2.1	2.3	7647564.6	667600.2	12/07/01	11:51:29	474	13.97	0.00	0.00	0.00	0.00	Ind	Ind	Ind	No	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind	Ind
93E B	15S	5.7	2.1	3.6	7647670.8	667455.4	12/07/01	11:58:49	480	14.00	89.81	6.42	5.50	7.80	2.30	32.56	2.33	No	0.88	3.13	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93F B	15S	4.6	2.1	2.5	7648076.2	667598.0	12/07/01	12:40:10	486	14.00	56.26	4.02	2.72	4.72	2.00	56.26	>4.02	Yes	>2.72	>4.72	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93G B	15S	7.6	2.1	5.5	7648318.1	667522.6	12/07/01	12:46:17	492	14.00	68.73	4.91	3.32	6.27	2.95	35.42	2.53	No	1.32	4.23	4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93H A	15S	16.6	2.1	14.5	7648673.8	667567.3	12/07/01	12:54:03	496	13.97	125.22	8.96	8.27	9.15	0.88	18.96	1.36	No	1.15	1.83	4-3/>4/4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93I A	15S	10.8	2.1	8.7	7648743.4	667553.3	12/07/01	13:00:47	502	14.00	81.83	5.85	5.07	8.32	3.25	48.44	3.46	No	2.10	4.68	4-3/>4	-1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1
93I C	5S	12.5	2.1	10.4	7648733.7	667547.2	12/07/01	13:02:18	505	14.02	174.99	12.48	11.82	14.67	2.85	87.01	6.21	No	3.22	9.45	>4-3	1	>4	0	0.00	0.00	0	0.00	0.00	0.00	1

Station/ Rep		Comments
1A	B	Large piece of woody debris or large rock, penetration inhibited in all reps.
1B	A	Tan silty fine sand, dense amphipod tubes at SWI, RPD > penetration, area of sediment transport , nice pic.
1C	A	Moderately sorted silty fine sand with abundant amphipod tubes in the foreground, area of sediment transport and sand appears to hydrodynamically stable particle size. Nice Pic.
1D	B	Moderately sorted light-hued silty fine sand with amphipod and worm tubes at SWI, very similar to 1C, area of sediment transport, RPD appears dominantly physical and is expressed by the extent of fines in the sediment column.
1E	B	No penetration, likely on debris or hard substrate, 3 reps similar.
1F	A	No penetration, likely on debris or hard substrate, 3 reps similar.
2A	C	Tan to gray, moderately sorted fine sand with tubes at SWI and void lower mid-left, surface roughness from physical forces, RPD a combination of physical and biological processes, area of sediment transport.
2B	A	Very well sorted fine sand, virtually no fines precluding an RPD, bedform/ripple, area of active sediment transport as sediment column appears winnowed of nearly all fines.
2C	A	Well-sorted fine to medium sand with faint band of fines that defines the RPD, sand advancing over the RPD at left SWI, RPD dominantly physical, area of active sediment transport.
2D	C	Poorly sorted silty tan to gray fine sand, amphipod tubes at left SWI, void in RPD upper mid left and void lower right, RPD both physical and biological, sorting increases in RPD, washed surface, area of sediment transport.
2E	A	Poor to moderately sorted silty fine sand, organic particles interspersed throughout sediment column, RPD>penetration, sand is light brown, bedform, area of sediment transport.
2F	C	Moderately sorted light, slightly silty fine sand, small shallow void in upper right, tubes in background in right SWI, RPD defined by extent of fines, area of sediment transport, RPD dominantly physical in origin, bedform.
3A	A	Layered, tan poorly sorted fine sand over tan sandy silt, 4.6 cm depositional layer at SWI with fining upwards sequence, tubes at SWI, shallow void in center and void in lower left, buried RPD, station is in an area of sediment transport and deposition, nice pic.
3B	C	Tan, slightly silty fine sand with abundant amphipod tubes at SWI, RPD > penetration although a biologically induced accumulation of silt near the SWI exaggerates an RPD -like effect at SWI, bedform, area of sediment transport, very similar to transect 2 stations.
3C	C	No penetration, hard substrate, 3 reps similar.
3D	A	Firm tan fine sandy silt with dense amphipod tubes at SWI, numerous voids in sediment column, some voids are very shall, area flow and it appears that the tubes sequester fines. Nice pic.
3E	B	Tan, slightly silty fine sand, RPD denoted by band of fines interspersed in the sand near SWI, whole sediment column may be oxidized, tubes in SWI background, area of sediment transport, similar to other stations.
3F	A	Tan, well-sorted fine sand with abundant tubes and scattered small rounded mudclasts at SWI, are of sediment transport, appear that entire sediment column is oxygenated and RPD > penetration.
4A	A	Tan to gray, poorly sorted silty fine sand, tunes at SWI, organic particles interspersed throughout sediment column, deep RPD, appears depositional.
4B	B	Tan to light gray, poorly sorted fine sand, tunes in background, bedform crest, area of periodic sediment transport, small organic particles in upper sediment column although sediment does not appear organically enriched, similar to Rep A, but with more sed transport features.
4C	A	Tan, organic, slightly silty fine to medium sand with amphipod tubes at SWI, RPD > penetration, RPD physical in origin, area of sediment transport, sand are darker colored than reps A and B, fine organic particles interspersed in sediment column.
4D	B	No penetration, hard substrate or on debris, 3 reps similar.
4E	C	Tan to gray, silty fine sand with worm tubes at the SWI, sorting increases at the SWI, surface washed, depositional in an area of sediment transport.
5A	B	Tan to light gray silty fine sand, small tubes in SWI background, classic physical RPD, scattered organic particles in sediment column, area of periodic sediment transport.
5B	A	No penetration, hard substrate, stick in background, penetration impeded.
5B	F	Tan sandy silt over gray sandy silt, voids in lower center abundant fine shell fragment interspersed throughout sediment column, important to note that all other reps at this station were on debris, soft sediment is anomalous, station appears highly depositional and shell fragment input is likely related to the proximity of submerged debris.
5C	B	Exceptionally hard fine sand, minimal penetration, surface washed, area of active sediment transport.
5C	D	Tan sorted silty sand with gravel at surface, area of active sediment transport, physical RPD and RPD > penetration.
5D	A	Layered, tan and gray silty fine sand, void in upper right, tubes at SWI, two types of worm tubes present, subsurface methane 9.8 cm below the SWI and extending to the bottom of the frame, methane presence is minor, three similar fining upwards sequences discernible with the layer (from top to bottom) being 2.3, 3.6, and 4.1 cm thick, episodic deposition.
5D	C	Moderately sorted dark, silty fine sand overlying poorly sorted fine sandy gray silt, contact distinct, RPD depositional with minor aggregation, two clear depositional intervals, top interval is 4.4 cm thick and underlying interval is 2.9 cm thick, area of episodic deposition with each depositional layer having a fining upwards sequence.
5E	D	Tan silt veneer over very hard silt/clay, appears recently disturbed, RPD depositional.
5E	E	Tan silty fine sand overlying gray silt/clay, firm sediment, temporarily depositional with transgressing sand layer at SWI, area of periodic sediment transport.
6A	A	No penetration, hard substrate, cohesive mudclasts in near foreground, recently disturbed.
6B	A	Light gray and tan, fine sandy silt, void lower left, tubes at SWI right, feeding depression in left background, station appears stable and depositional, surface relief biological, RPD biological.
6C	A	Tan, silty fine sand with abundant amphipod tubes at the SWI, sorting increased near the SWI, hard, evidence of sediment transport, sand grains are dark hued.
6C	D	Sorted to poorly sorted tan fine sand overlying gray silt, surface shows evidence of sediment resuspension, area of sediment transport and resuspension, nice pic.
6D	A	Tan, very silty fine sand overlying gray silty fine sand, void at depth, sand fraction increases near the SWI, some evidence of sediment transport at surface but station appears dominantly but episodically depositional.
6E	B	Very hard, tan fine sandy silt, minimal penetration, possible exposed native silt/clay.
6E	D	Tan silt fine sand with washed surface, area of sediment transport, minimal penetration, RPD physical in origin and RPD > penetration.
7A	C	Light gray fine sandy silt with physical RPD, low contrast RPD, scattered organics at SWI, station is depositional, very fine organics sparsely interspersed in sediment column, subsurface methane present 5.9 cm below the SWI and extending to the bottom of the frame.
7B	B	Light gray sandy silt with prominent burrow/void complex at right, organic debris at SWI, RPD deepest at feeding/burrow depression, small tubes in background on rim of feeding depression, low contrast RPD, station appears depositional.
7C	A	Light gray very fine sandy silt with prominent void in lower center, small void in lower left, evidence of sediment resuspension at SWI with increased sorting and fine sand present, station appears to be dominantly depositional, relict RPD present 3.85 to 5.7 cm below the SWI.
7D	A	Tan to light gray very fine sandy silt with numerous small feeding voids subsurface, RPD well developed with good contrast and appears to be both biological and depositional, fresh sand input at SWI with admixed fines, station appears depositional and is well bioturbated.
7E	A	Tan silty fine to medium sand, organic debris at SWI, poor sorting, appears dominantly depositional based on the fines admixed with the sands.
8A	A	Tan to brown, organic, slightly sandy silt with large bark chip at SWI, large organic particles interspersed throughout sediment column, appears depositional, silt mantle on bark chip, RPD > penetration, has optical qualities of a soil.
8B	A	Light gray slightly fine sandy silt with low contrast biological RPD and small subsurface feeding voids, nice tubes at SWI, station is depositional and it appears that organics are being processed, nice pic.
8C	C	Gray fine sandy silt with feeding voids in upper and mid-left, small tubes at SWI, red worm at right 9.39 to 10.31 cm below the SWI, station is depositional, fecal matter and biogenic aggregates at SWI.
8D	C	Gray fine sandy silt with abundant amphipod tubes at SWI, fines are being sequestered by the tubes, biological RPD, sand content appears to increase near the SWI, station is depositional, nice pic.
8E	C	Gray, relatively homogeneous sandy silt with very deep RPD, void lower left, biogenic aggregate at SWI, RPD both depositional and biological, station is depositional, good RPD contrast.
8F	C	Tan, silt fine sand, abundant fines at SWI, appears depositional.
9A	A	Gray, organic, silty fine sand, broken tube at SWI, abundant small dark organic particles interspersed throughout sediment column, station is depositional.
9B	A	Gray slightly sandy silt with tubes at SWI, feeding void lower right, red worm above feeding void 11.77 to 12.37 cm below the SWI, station is depositional, band of fine sand at base of RPD, subsurface sediment homogeneous.
9C	A	Gray slightly sandy silt with void mid-left, high biological surface relief, subsurface sediment homogeneous, station is depositional.
9D	C	Hard, poorly sorted fine sand, area of sediment transport, flat SWI.
9E	A	Tan to gray organic slightly sandy silt with deep depositional RPD, abundant small dark organic particles interspersed in the sediment column, station is highly depositional.
9F	B	Tan slightly fine sandy silt overlying gray silt, void in lower center of frame, tubes at SWI, surface shows evidence of sediment resuspension, area of sediment transport and deposition.
10A	B	Tan to brown silty fine sand, silt veneer at surface, poor sorting, although depositional at present it appears that sediment column is physically reworked by sediment transport/bedload transport, homogeneous fabric, RPD defined as surficial silt layer although subsurface sand may be oxygenated.
10B	A	Gray, soft, slightly sandy silt with feeding voids at right, right surface relief is biogenic mound, methane at lower right 15.95 to 16.49 cm below the SWI, station is depositional, oxidized mudclasts at SWI.
10C	C	Gray sandy silt with abundant amphipod tubes at SWI, thin later of well-sorted fine to medium sand at center of SWI and is 0.62 cm thick, biological RPD, station undergoes periodic sediment transport but appears to be net depositional.
10D	B	Overpenetrated, gray soft silt with deep depositional RPD, voids in lower center of frame, methane present as small to very small pockets 19.9 cm below the top of the frame and extend to the bottom of the frame, station is highly and rapidly depositional.
10D	E	Tan to brown organic soft silt, homogeneous fabric, RPD > penetration, station is highly depositional.
10E	A	Soft gray slightly sandy silt with deep depositional RPD, small voids in right-center and right, RPD deepest above right void, methane present as small and medium pockets 14.47 cm below the SWI and extending to the bottom of the frame, thin band of brown fine sand at base of RPD, station is depositional.
10F	B	Brown silty fine sand, subsurface moderately sorted and silt fraction increases at the SWI, RPD > penetration, area of sediment transport and periodic deposition.
11A	B	Gray, sandy silt with prominent feeding void in lower center, mound above feeding void, layer of brown fine sand in RPD indicating that RPD is both depositional and biological, thin 0.4 cm layer of biogenic aggregate/fecal material at SWI, station is depositional, nice pic.
11B	A	Soft, gray, bioturbated slightly sandy silt with numerous prominent subsurface feeding voids, RPD both depositional and biological, distinct 4.19 cm layer at surface that is depositional yet RPD extends below that, red worm in lower left 16.67 to 18.32 cm below the SWI, station is depositional.
11C	A	Soft gray slightly fine sandy silt with subsurface feeding voids on the left of frame, two red worms at lower right 16.05 to 18.49 cm below the SWI, RPD both depositional and biological, station is depositional.
11D	C	Tan silt overlying poorly sorted gray silty sand, thick accumulation of recently deposited silt and this deposit constitutes the RPD, evidence of periodic deposition and sediment transport (silt=deposition; basal sand=sediment transport).
11E	A	Soft gray silt with deep, depositional RPD, 4.05 cm depositional layer at very surface and is part of RPD, oxidized burrows/voids at depth within the sediment column, station is depositional.
11F	C	Tan to brown silty fine to medium sand overlaying uniform methanogenic gray silt/clay with feeding voids, sands are clearly transgressive, silt lamination associated with crossbedding and bedload transport are apparent in the sand layer, contact between sand and silt very sharp, excellent photo, area of sediment transport.

Station/ Rep		Comments
12A	A	Gray homogeneous sandy silt with very minor small methane pockets 14.19 cm below the SWI extending to the bottom of the frame, deep low contrast depositional RPD, station is depositional.
12B	A	Soft, gray sandy silt with small voids in center and lower right of frame, depositional RPD with brown fine sand at base 3.57 cm below the SWI, station is depositional, subsurface sediment has homogeneous fabric.
12C	A	Soft, gray organic, sandy silt with subsurface methane pockets 14.27 cm below the SWI and extending to the bottom of the frame, deep depositional RPD, small tube in right center SWI, station is highly depositional.
12D	B	Soft brown silt overlying gray silty sand, sand at bottom of frame 16.01 cm below the SWI, very deep depositional RPD, mudclasts at SWI, station is highly depositional, small organic particles interspersed throughout the sediment column.
12E	B	Soft gray silt with numerous subsurface small and large feeding voids, depositional RPD with 3.75 cm layer of recently deposited material, legged/peripodid organism in lower center of frame, station is highly depositional.
12F	B	Disturbed, poorly sorted silty medium sand, very little penetration, hard substrate, no penetration at left of frame. Area of active sediment transport.
12F	C	Fine to medium gray sand overlain by admixed tan silt and sand, station is in area of periodic deposition and sediment transport, RPD depositional and defined by the extent of recently deposited silt into the sediment column.
13A	B	Tan silt overlying poorly sorted silty fine sand, depositional RPD, broken tube in background, station appears depositional, scattered small organics in sediment column.
13B	A	Soft gray slightly sandy silt with large feeding voids at lower right of frame, depositional RPD with band of brown fine sand 3.27 cm below the SWI, subsurface sediment has homogeneous fabric, station is highly depositional.
13C	C	Soft gray fine sandy silt with voids in right center of frame, small tube at SWI, slightly sandier at SWI, depositional RPD, station is depositional.
13D	C	Tan silt overlying layered poorly sorted and sorted silty fine to medium sand, episodically depositional and periods of sediment transport, layers denoted by basal sorted fine to medium sand and thicknesses from top to bottom are 4.9 cm, 3.51 cm, and 2.07 cm.
13E	C	Soft gray slightly sandy silt with large void at left and small voids within the RPD, RPD thick and is both biological and depositional, station is depositional.
13F	A	Tan to brown silty fine sand overlying gray sandy silt, prominent void in center of frame and smaller void in lower right of frame, RPD defined by the extent of silt admixed into the sand layer from the top-down, area of sediment transport and periodic deposition.
14A	A	Uniform tan to olive-gray silty very fine sand, homogeneous fabric, silt veneer at SWI, depositional RPD, station is in area of likely sediment transport and periodic deposition.
14B	A	Soft gray sandy silt with voids at mid-left and upper right, subsurface sediment has uniform texture, dark sand grains near SWI, station appears depositional.
14C	B	Very soft organic silt with very deep depositional RPD, overpenetrated, high water content, abundant small dark organic particles interspersed throughout the sediment column, station is highly depositional.
14C	E	Tan to brown soft silt, abundant organic particles interspersed throughout sediment column, recently deposited sediment layer at the SWI that is 2.47 cm thick and has a basal band of brown fine sand, RPD >penetration, station is highly depositional.
14D	C	Very soft slightly sandy organic silt with prominent subsurface feeding voids and large organism lower center, overpenetrated, highly depositional.
14D	E	Tan to brown soft organic silt, deep depositional RPD with very subtle contrast at bottom of frame, station is highly depositional.
14E	B	Soft gray slightly sandy silt with feeding voids lower left and lower right, depositional RPD with brown sand layer (basal contact) 4.22 cm below the SWI, station is depositional.
14F	A	Dark gray fine to medium sand with a tan silt veneer overlying gray homogeneous silt with voids, RPD is defined as the extent of recently deposited silt admixed into sand layer, sand layer varies in thickness from 3.9 to 9.9 cm, contact between silt and sand layer sharp, area of periodic sediment transport and deposition.
15A	B	Tan to gray, poorly sorted, silty fine sand, bedform with tubes at SWI, area of sediment transport and periodic deposition, sands are stiff.
15B	A	No penetration, either hard substrate or on debris, all three reps similar.
15B	E	Sorted silty fine to medium brown sand, surface shows evidence of sediment resuspension, area of active sediment transport, small scale bedforms at SWI, RPD physical in origin and RPD > penetration.
15C	A	Soft organic gray sandy silt with shallow void in upper right, abundant organic particles interspersed throughout the sediment column, RPD is depositional and low contrast, station is highly depositional, tubes at right SWI.
15D	B	Soft organic slightly sandy gray silt with abundant organics at SWI, small voids in center of frame and right, subsurface methane pockets at right 12.89 to 16.37 cm below the SWI, station is depositional, RPD is dominantly depositional.
15E	A	Soft gray slightly sandy silt with abundant large well-formed feeding voids in subsurface sediment, RPD a combination of biological and depositional processes with thin band of brown sand near lower bound 3.99 cm below the SWI, RPD depressed downward in center of frame immediately above largest feeding void, excellent pic, station is depositional.
15F	B	Firm organic slightly sandy silt with abundant woody/organic debris at SWI, bedform, depositional RPD, station appears to be depositional.
15F	C	Gray silty fine sand with organic particles interspersed throughout the sediment column, void in left center of frame, methane pocket in lower right, surface disturbed by camera frame but this rep different from rep b, station is depositional.
16A	C	Poor to moderately sorted silt fine to medium dark sand, bedform, RPD extends beyond penetration in most of slide, area of sediment transport.
16A	H	Tan silt over brown sorted fine sand, area of periodic sediment transport and deposition, RPD defined as tan silt layer although sand appears oxidized to depth.
16B	C	Hard silty brown sand, tubes and organic debris at SWI, RPD > penetration, area of sediment transport.
16B	G	Minimal penetration, brown fine sand with abundant amphipod tubes in background, surface colonization, very hard substrate, area of active sediment transport, RPD > penetration.
16C	A	Gray sandy silt with void in right center and subsurface small to medium methane pockets at lower right 8.48 to 11.92 cm below the SWI, patch of fine sand at mid left of frame, depositional RPD and low RPD contrast, station is depositional.
16D	A	Soft, gray slightly sandy silt with feeding voids at mid-left and lower right of frame, deep depositional RPD, abundant organic particles interspersed in the upper part of the RPD, subsurface sediment has homogeneous fabric, station is highly depositional.
16E	D	Firm organic sandy silt with abundant organic particles interspersed throughout the sediment column, shallow small voids in upper right, red worm in mid left 6.24 to 6.97 cm below the SWI, station appears slowly depositional.
17A	A	Dominantly fine to medium sand mixed with fines, light-hued, surface is washed, appears erosional, larger particles at sediment water interface, bedform, poor sorting, possible tube in the background, shallow errant burrows.
17B	A	Washed sand at SWI, with fine admixed below SWI, becoming sorted medium sand at bottom, kinetic area, sand light colored (evolved), bedforms.
17C	A	Soft gray sandy silt, nice tubes at SWI, becomes silty sand at bottom of frame, RPD contact indistinct and gradational, low contrast and no methane, appears depositional and poorly consolidated.
17D	A	Soft gray slightly fine sandy silt, abundant subsurface feeding voids and nicely developed RPD, fine tubes at SWI, no methane, highly depositional and unconsolidated.
17E	B	4.6 cm layer of fine to medium dark sand overlying gray homogeneous silt/clay. Tan floccs-detritus admixed with sand at SWI and defines the RPD, sharp contact between sand and silt indicating disturbance followed by deposition of the sand, possible cyclical deposition/erosion, no methane.
18A	C	RPD contrast very subtle, voids in lower right have methane bubbles, organic particles (wood?) interspersed at depth within the sediment column, appears depositional although penetration is limited.
18B	C	Moderately sorted fine to medium sand with silt admixed in the upper portion of the sediment column, appears to be a 2.8 cm layer overlying buried RPD, appears temporarily depositional but sorted sand at the bottom of the frame belies any long-term accumulation of fine-grained sediment.
18C	A	Sandy silt with 0.5 cm layers of medium to fine sand spaced at 7cm intervals in gray silt/clay, some sorted medium sand at SWI, appears to be episodically depositional with fines accumulating and then deposition of sands. Net depositional, shallow burrows near SWI.
18D	A	Gray fine sandy silt with void in lower right, overlying fine to medium gray sand with methane accumulation at contact between silt and basal sand, appears to be net depositional, sand fraction increases near the SWI
18E	A	Soft gray slightly sandy silt with nicely developed feeding voids mid-right and visible red poly/oligochaetes at bottom of frame. Appears highly depositional and unconsolidated.
18F	A	Well sorted medium light sand with well-developed asymmetric bedforms, indicative of net transport, shallow water, nice picture.
19A	A	Well-sorted fine sand with developed asymmetric bedforms indicative of net transport, shallow water, small wood debris in troughs of ripples.
19B	C	Gray organic silt with organic detritus interspersed subsurface, appears net depositional with hard surface underlying the recent silt, 3 1 cm or less mudclasts at SWI, oxygenated burrows at depth, deposit feeders present.
19C	A	Light-hued well-sorted fine sand with very minor fines, small woody debris at SWI, appears to be in area of net transport although bedforms are not visible, surface of sediment is washed free of fines.
19D	A	Light gray slightly sand silt with subtle gradational RPD contrast, buried bivalve/shell fragment lower right, red poly/oligochaete ate lower mid-left, appears depositional with no methane, surface relief is biological.
19E	B	Tan poorly sorted fine sand, surface shows evidence of resuspension, RPD is cryptic and is delimited by band of admixed silt immediately below the SWI, RPD appears to be due to physical mixing more than biological processes, station appears to be either static or non-depositional based on the increased sorting with depth.
20A	A	Tan deep RPD subtlely transitioning to light gray silt. Minor fine sand subcomponent. Two well developed feeding voids in mid-center of frame and above these voids the RPD is better developed, appears depositional.
20B	B	Abundant small tubes at SWI, light gray fine sandy silt, distinct stringer of dark medium sand 12.7 cm below the SWI and stringer varies in thickness from 0 to 2 cm thick, based on the sequence of silt over sand over silt, this station appears to be net depositional with deposition occurring in pulses during quiescent periods. The presence of the sorted sand stringer indicates, in the absence of a defined sand input, that the station also undergoes periodic erosion.
20C	A	Poorly sorted silty fine sand, excellent picture showing the contribution of physical forces to RPD development, as oxidized silt particles are being both accumulated and buried by bedload transport. Small tubes at the SWI in background.
20D	A	Very soft, gray slightly sandy silt, tubes at surface, surface relief is biological, RPD contrast very subtle and estimated in some spots, relict void underneath mound surface, methane at depth present in small voids, station is highly depositional.
20E	A	Gray fine sandy silt with two nicely developed voids in center of frame, surface relief is biological, sand fraction is greater in upper portion of the sediment column and me be an artifact of increased porosity from bioturbation, RPD contrast subtle, methane at depth. Nice pic.
21A	B	Organic, fine sandy silt with deeply developed RPD. Abundant organic particles throughout sediment column, highly depositional, tubes at SWI, reticulated burrow network at depth from deposit feeder activity.
21B	A	Very soft, gray organic fine sandy silt, highly depositional, methane bubbles at depth, nice void right-center of frame, even-nicely developed RPD.
21C	A	Slightly sandy firm silt, little penetration, surface appears washed, does not look depositional, debris drag down at right of frame, burrows in center of frame.
21D	B	Soft gray, organic, slightly sandy silt with void at left of frame, small methane pocket lower left, well-developed RPD . Station appears depositional.
21E	C	Moderately sorted fine to medium sand with lens of silt at SWI, sand appear mature and surficial fines define the RPD, relict RPD also present 2 cm below the SWI, this station appears transitional-transitional, very unusual.
21F	A	Similar to 21E, sorted medium to fine sand, mature sands, dusting of silt at SWI, station appears erosional or static.
22A	B	Moderately sorted fine sand overlaying gray clay, methane bubbles in contact between sand and clay, small mudclasts and small tubes at SWI, RPD defined by extent of fines in sand layer and appears to have formed through a combination of physical and biological processes. Due to methane, this station is probably net depositional with alternating periods of accretion and erosion (assuming no allochthonous sand input).
22B	B	Soft gray fine sandy silt with well-developed feeding voids, RPD discontinuous and measured RPD is likely and underestimate due to the reduced sediment at the surface at the left of frame, abundant small methane voids at depth, poly/oligochaete in upper left, highly depositional.
22C	A	Soft gray slightly sandy silt with well-developed RPD that is continuous across frame and has a subtle continual gradation into the underlying reduced silt, minor small methane voids at depth, highly depositional.
22D	A	Soft gray fine sandy silt, highly depositional, subtle RPD contrast, abundant small methane pocket at depth (>12 cm).
22E	C	Tan silt veneer draped on poorly sorted dark fine sand, buried RPD at right, shows evidence of periodic resuspension, likely shipping/prop wash area, anthropogenically physically disturbed.
22F	B	Highly depositional with 3 1-2 cm depositional intervals and buried RPDs in upper sediment column, slightly fine sandy gray silt, abundant small methane pockets 10 cm and downward below the SWI, excellent picture of rapid deposition.

Station/ Rep		Comments
22H	B	Highly depositional with 4 distinct 1 cm depositional layers apparent immediately below the SWI, RPD encompasses 2-3 distinct layers with fining upwards sequences, relict RPD 5 cm below SWI, layer of well-sorted fine to medium dark sand 12.3 cm below SWI. This station appears to be undergoing rapid deposition which is outpacing the methanogenesis and the reduction of buried oxidized particles.
23A	B	Silty fine sand with pocket of woody/organic debris in lower left center. This debris appears to have minimized penetration, boundary relief appears physical, unclear whether depositional.
23B	A	Soft gray slightly fine sandy silt with nice voids at depth, large oligochaete in lower left, two methane pockets, station appears to be depositional with deposition occurring at a rate than can be matched by infaunal migration.
23C	B	Well-sorted light sand with minor amounts of subsurface silt. Appears erosional, surface washed free of fines.
23D	C	Slightly fine sandy, soft, gray silt with well-developed voids. Deep and continuous RPD that has subtle transition to underlying gray reduced sediment. Depositional.
23E	A	Silty gray fine sand, RPD is both physically and biologically influenced, surface relief appear physical in origin, small void/burrow in mid center. Subtle RPD contrast.
24A	A	Gray, slightly sand sit with prominent large void complex in center of frame, biological surface relief and large burrow, small methane pocket in void, RPD is thickest directly above void and is a result of the deep burrowing, very nice example of deep-bioturbation.
24B	B	Abundant small tubes at SWI, soft fine dandy gray silt, abundant methane at depth, textural change at depth appears to be due to methane ebullition rather than feeding voids, highly depositional.
24C	B	Soft, sandy silt with subtle RPD contrast, abundant pockets of medium dark sand in sediment column, distinct basal layer of sorted medium sand which is underlain by blue-gray silt, possible dredge cut, depositional station. Nice pic, small worm in upper left.
24D	A	Soft gray sandy silt with nice voids in lower center of the frame, highly depositional , RPD contrast subtle and RPD discontinuous, RPD is likely overestimated but is an artifact of the discontinuity of the RPD.
24E	B	Gray sandy silt, surface sed iment is sorted and covered with veneer of fines, depositional, notable for lack of methane and voids along with the textural homogeneity of the subsurface sediment.
25A	A	Soft, gray, slightly sandy silt with voids and abundant small subsurface methane pockets, surface relief is biological, highly depositional, small organic particles interspersed throughout sediment column, large worm lower left-center.
25B	A	Silty fine sand with stick protruding from the sediment, silt fraction is greatest in the upper portion of the sediment column suggesting that this station is periodically depositional.
25C	A	Gray firm silt with floccular tan RPD, possible dredge cut, minor sand at bottom of frame, small worm in center of frame, textural homogeneity.
25C	B	Soft, gray, homogeneous silt, well-developed voids in center of frame, highly depositional, pair with 25c Rep A and appears to be due to depositional differences due to elevation of dredge cut (25C rep B being in low spot). Nice pic of rapidly depositional area (rapid deposition precluding methanogenesis).
25D	C	Floccular tan RPD overlying firm light gray clay, appears depositional but possible old dredge cut based on firmness of substrate, small organic particles interspersed in surface sediments.
26A	B	Tan fine sand over gray silt/clay, abundant organic particles in surficial sand layer, bedforms, tube in left background, unclear whether erosional or depositional however there is active sediment transport at this station.
26B	A	Gray silt with prominent voids in center of frame, mound above largest void, dragdown of RPD, minor small dark organic particles in upper portion of the sediment column, appears depositional.
26C	A	Soft gray silt with well-developed near uniform RPD, two well-formed void, layer of sorted fine to medium sand 16/6 cm below the SWI, layer continuous across frame and is underlain by uniform blue-gray clay, distinct depositional contact possibly from cyclical depositional sequence. Station is highly depositional.
26D	A	Silty fine sand, RPD discontinuous therefore indeterminate, void mid-right, basal layer of fine to medium sorted sand, mound above void.
26E	B	Silty fine sand over blue-gray silt clay, sandy layer 13.7 cm thick, methane at bottom of frame, depositional. Surface sediment is floccular, appears to be sequenced deposition.
27A	C	Silty fine sand with shallow penetration, bedform at surface, minor organic debris in surface sediment, unclear whether erosional or depositional.
27B	A	Soft slightly sandy gray silt with abundant subsurface methane in small pockets, well developed RPD that is continuous, highly depositional.
27C	A	Gray slightly sandy silt overlying well sorted fine to medium sand. Sand layer 16.3 cm below SWI and appears to be lag/winnowed deposit, diagonal thin (<0.3 cm) sand stringer in silt layer, RPD follows surface topography, depression/burrow located immediately above feeding void, red worm in center of frame. Station is depositional.
27D	F	Soft tan to gray organic slightly sandy silt with 2.59 cm thick layer of recently deposited silt, voids upper right and upper mid-left, abundant dark organic particles interspersed throughout upper sediment column, station is depositional.
27E	A	Soft, gray, slightly sandy silt with well formed void in right center and abundant small to medium sized methane pockets 14.7 to 19.5 cm below SWI, station appears highly depositional, abundant small tubes at SWI.
27F	A	Soft, gray slightly sandy silt with very loose surface sediment and abundant small to medium methane pockets at bottom of frame (below 13 cm), appears to be depositional and there is textural homogeneity in the subsurface sediment indicating little disturbance since deposition.
27G	B	0.4 cm layer of sorted medium sand overlying 7.4 cm layer of gray slightly sandy silt which in turn overlies 8.4 cm of dark well-sorted medium sand. Unusual sequence and appears to be alternately depositional and erosion, or alternatively there is an anthropogenic input of medium dark sand (sandblast grit?). SWI shows evidence of resuspension (propwash).
27H	B	Very soft, gray silt with small methane void in lower left, slightly overpenetrated, highly depositional, uniform texture throughout.
27I	C	Very soft gray silt with minor sand subcomponent in upper portion of the sediment column, relict/not so active voids in lower center of frame, RPD appear to be very water rich and is an artifact of both biological activity and rapid deposition, small worm left center of frame, small organic particles interspersed in RPD, highly depositional.
28A	A	Gray, organic silty fine sand, abundant small organic and wood particles interspersed throughout the sediment column, RPD transition is diffuse and very subtle contrast, RPD appears to be due to deposition, abundant small and large methane pockets 11.2 cm below SWI, highly depositional.
28B	B	Very soft, gray slightly sandy silt with abundant methane pockets 14 cm below SWI, void left center, RPD is thick and is likely an artifact of rapid deposition, subsurface sediment is of near-uniform texture, highly depositional.
28C	A	Overpenetrated, very soft gray silt, abundant small methane pockets at depth (>12 cm below SWI), homogeneous subsurface texture, highly depositional.
28D	A	Soft gray silt with minor sand fraction in upper 4 cm of sediment column, faint stringer of gray fine sand 18.5 cm below SWI, rapid deposition, no methane.
28E	A	Poorly to moderately sorted, dark gray medium to fine sand overlying sand gray silt, evidence of resuspension at the SWI, two large red worms at bottom of frame, large methane pocket, abundant organic particles admixed with the sand, appear depositional, surface sediment has higher fraction of silt than subsurface sediment.
28F	A	Soft, gray, fine sandy silt with abundant small methane pockets at depth (>10.9 cm below SWI), highly depositional, RPD is thick due to apparent rapid deposition. Subsurface sediment has near-uniform texture.
29A	A	Soft gray slightly sandy silt with abundant small methane pockets at depth (>11.1 cm below SWI), subsurface sediment is homogeneous, surface sediment has some floccs and RPD appears to be thickened by depositional processes. Highly depositional.
29B	B	Moderately firm gray silt with fine to medium sand subcomponent near the surface, abundant large well-formed feeding voids, intensely bioturbated, methane bubbles in void at depth (>9 cm), shell particle in lower right, appears depositional, RPD thinly developed and highly invaginated.
29C	A	Very soft, slightly sandy gray silt, RPD discontinuous across frame and only RPD on right measured, voids in center of frame, very small methane bubble in lower left of frame 19.5 cm below SWI, subsurface texture in homogeneous, highly and rapidly depositional.
29D	B	Very soft, gray, slightly sandy silt with active and relict voids in center of frame, small pockets of methane present >19.2 cm below SWI, red worm 18.1 cm below SWI in lower left of frame, highly depositional, RPD is artificially thick due to rapid deposition.
29E	A	6.9 cm layer of poorly sorted silty fine sand overlying gray silt/clay, sand appears mature and is light in hue, RPD is deep and appears to be physically influences, buried leaf at lower mid-left, methane pocket at contact between basal silt and overlying sand in mid-right. Appears to be periodically depositional or over an existing dredge cut.
29F	B	Dark gray, poorly sorted, sandy, shelly organic silt, void mid left, highly depositional, RPD contrast is subtle and RPD as not well developed as other stations along transect, appears periodically depositional based on thin lenses of poorly sorted sand and shell. Unusual slide.
29G	A	3.1 cm layer of black medium sand overlying rich gray silt, contact between two layers is distinct, RPD defined by recent accumulation of fines on top of the sand layer, disturbed, unclear whether net erosional or depositional based on sedimentary fabric. Sand is anthropogenic in origin.
30A	A	Intensely bioturbated, gray slightly sandy silt, abundant feeding voids, large red worm mid-right, minor small methane pockets 10.6 cm below SWI, appears depositional.
30B	C	Light gray, slightly fine sandy silt with well-developed RPD, small organic particles interspersed throughout sediment column, small methane pockets 10.3 cm below SWI, void (partially collapsed) mid left, depositional.
30C	A	Light gray silty fine sane, surface shows evidence of resuspension, layer of fine light gray sand at bottom of frame 1.5 cm thick and 10.8 cm below SWI, oxidized mudclasts (4) at surface, stringer (flaser?) of sand 4.1 cm below SWI at left, episodically depositional and erosional.
30D	B	Light gray homogeneous sandy silt overlying well-sorted dark gray medium to fine sand. Silt layer 15.6 cm thick, sand layer >4.1 cm thick. Depositional, silt layer is devoid of methane suggesting rapid deposition over basal sand, RPD contrast subtle and thickened via deposition.
30E	A	Poorly sorted silty fine sand overlying gray silt/clay, feeding voids center and left center, methane bubbles in center feeding void, sand layer 6.9 cm thick, unusual sequence.
31A	A	3.8 cm layer of poorly sorted silty fine sand over gray silt/clay, abundant methane in underlying silt 8.1 cm below the SWI, large red worm at left, floccular and aggregated particles at SWI, depositional.
31B	B	Soft, organic, fine sandy silt with abundant large methane vesicles at depth within the sediment column, highly depositional.
31C	A	Gray, organic, slightly sandy silt over moderately sorted gray fine sand, top silt layer is 9.7 cm thick, basal sands are >1.4 cm thick, sand and organic particles interspersed throughout silt layer, appears depositional above the basal sand layer.
31D	A	Light gray, soft silt with prominent feeding voids in center of frame, RPD parallels surface topography suggesting influence of physical forces, bedform at left, extraordinary example of biogenically aggregated sediment resisting bedload transport at right center of SWI, depositional with discernible sediment transport.
31E	B	Light gray, soft, slightly fine sandy silt with prominent voids at right center, RPD contrast subtle, small methane pockets in lower right, depositional.
32A	B	Tan silt, appears to be mantle over woody or other debris, highly irregular surface.
32B	A	Light gray sandy silt with a stringer of well sorted gray medium sand 14.9 cm below the SWI, sand sequence fines upward into upper silt deposit, beneath san is blue-gray homogeneous silt-clay, methane present in sand layer in a disassociated vesicle, depositional with sand stringer denoting the base of an individual depositional unit.
32C	A	Very soft, gray, slightly sandy silt with developed feeding voids mid-right, RPD artificially thickened by deposition, RPD contrast is subtle and gradational (artifact of gradual oxygen desorption and reduction with burial), abundant small methane pockets 15-20 cm below SWI, red worm in lower mid-left, nice methane escape channel in lower left. Highly depositional.
32D	A	Tan and gray, poorly sorted silty fine sand over gray slightly sand silt. Methane pocket 13.6 cm below SWI, red worm sectioned lower left, RPD artificially thick due to deposition and burial of oxidized particles, surface sand layer 5.4 cm thick. Episodically depositional.
33A	C	Light gray silty fine sand, poor sorting, sand is light colored and appears to be mature, abundant fine detritus at surface, unclear whether net erosional or depositional.
33B	C	Light gray, soft, slightly sandy silt, surface disturbed, subsurface sediment is homogeneous, few small methane pockets 16.7 cm below SWI, highly depositional.
33C	A	Poorly sorted silty fine sand with washed surface, small mudclasts (<0.5 cm) in background, station appears erosional.
33D	B	Sorted fine to medium sand, thin layer of silt at surface that defines the RPD, RPD controlled by physical and depositional forces rather than biological activity, appears erosional.
34A	A	Minimal penetration, hard and/or sloped bottom, only small sliver of sediment at left.
34B	A	Poorly sorted gray silt and fine to medium sand, bimodal grainsize distribution, small tubes in left background, sorted medium sand at SWI, resuspension/transport, RPD physically influenced, nice picture of semi-static sediment that undergoes periodic bedload transport.
34C	A	Poorly sorted silty fine sand, bedforms at surface, evidence of resuspension at SWI, area of sediment transport, RPD physically influenced and controlled by resuspension/deposition and presence of fines.
34D	A	5.4 cm layer of moderately sorted fine sand overlying gray silt, RPD influenced by resuspension and deposition, small worm in center of frame, contact between sand and silt layers well defined, small tubes at SWI, area of sediment transport.
35A	A	Sorted fine sand overlying blue-gray silt clay, erosional contact, veneer of fines at SWI, bedforms in background.
35B	C	Soft, gray, fine sandy silt with abundant small and large methane vesicles at depth (11.1-19 cm below SWI), highly depositional, RPD influenced by deposition, nice tubes at SWI at right, biological mound at right.
35C	C	Poorly sorted silty fine sand over sorted fine sand, erosional surface, small piece of woody debris in background, RPD physically formed, possible bedform at right.
35D	B	Soft gray, organic slightly sandy silt with abundant large and small methane vesicles 1-18 cm below SWI, organic detrital particles interspersed in upper portion of the sediment column, RPD influenced by deposition and burial of oxidized particles, highly depositional.

Station/ Rep		Comments
35E	B	Moderately sorted silty fine sand overlying gray silt, wood particle dragged down at right, void mid-left with methane bubble in void, in-situ methane 10.8 cm below SWI, RPD influenced by physical process, contact between upper 4.5 cm thick sand layer and underlying silt is distinct, area of sediment transport and periodic erosion/deposition.
36A	B	Poorly sorted silty fine sand with abundant small organic and woody fragments, silt veneer at surface that is captured in debris interstices, appears to be kinetically active, sediment transport.
36B	B	Poor to moderately sorted fine to medium sand, small tubes at surface, surface free of fines and appears to be undergoing sediment transport, light-hued sands (native), area of high current flow and sediment transport.
36C	B	Soft, gray slightly sandy silt overlying well-sorted fine to medium dark sand. Sand layer 12.9 cm below SWI, silt layer is depositional with buried RPD at left, tube at SWI in center, RPD influenced by deposition and resuspension.
36D	C	Silt mantle wood debris, tubes in background, grain size reflects wood particles.
37A	C	Silty fine sand with distinct depositional layers from sediment transport and accretion, buried RPD easily discernible at right and a result from burial by bedload transport, methane bubble 8.6 cm below SWI, a great example of how RPDs can be thickened by physical processes, the RPD measured is associated with the topmost layer only, abundant organic particles interspersed with sands, kinetically active area.
37B	A	Gray, homogeneous, slightly sandy silt, loose surface layer in upper 1 cm, minor shell fragments in upper sed column, relict void in lower center, RPD depositional, minor small organic particles in RPD, station appear to be depositional.
37C	A	Dark silty fine to medium sand, surface washed, high energy environment, active sediment transport, not depositional. Dense, dark lithic sand. RPD not present due to lack of fines in upper sediment column. Bedform.
37D	A	Poorly sorted, gray silty very fine sand, irregular surface, RPD influenced by deposition and physical processes, sediment appears static although unclear whether depositional or erosional, thin worm lower left.
37E	A	No penetration in all reps, debris laden, silt stirred up by camera.
38A	B	Surface appears scoured, grain size estimate appears to be skewed fine, stick in background, washed coarse sand and gravel particles at SWI, RPD thick, very unusual pic.
38B	B	No penetration, large log/wood debris in background, little detritus mantling debris, high-flow regime.
38C	C	Moderately well-sorted fine to medium sand with minor silt admixed near the SWI, washed surface, RPD generated via physical processes, sediment transport/erosional.
38D	A	Moderately sorted fine to medium sand, small bedforms at surface, sediment transport, dragdown feature at left, RPD physically influenced - resuspension, high flow regime.
38E	B	Gray, homogeneous, silty fine sand, irregular surface, RPD contrast very subtle, near featureless sediment column, depositional.
39A	A	Gray, homogeneous, soft, slightly fine sandy silt, abundant small methane vesicles 9-19 cm below SWI, RPD contrast subtle and RPD is a result of both biological and depositional process, station is highly depositional.
39B	A	Gray, organic, soft, silt with abundant small and large methane vesicles 13 to 21 cm below SWI, fabric disruption via methane ebullition at lower left, abundant small organic particles interspersed throughout the sediment column, RPD contrast subtle and RPD a combination of biological and depositional processes. Station is highly depositional.
39C	A	Gray, sandy silt overlying well-sorted fine to medium dark gray sand, feeding void upper mid-left, nice tubes at SWI in right of frame, silt layer 11.1 cm thick and is depositional, basal sand layer suggests that this station has periodic high current flows and can be subject to periodic intervals of sediment transport. RPD contrast subtle and is dominantly biological in origin. Station appears depositional but with a low accumulation rate based on the biological colonization.
39D	B	Gray sandy silt overlying well-sorted fine to medium sand, surface shows evidence of washing/winnowing, RPD physically controlled and contrast is subtle, area of sediment transport.
39E	B	Water shot, no penetration, on debris all reps, possible submerged piles.
39F	C	Poorly sorted, gray, silty fine sand, prominent bedform, sediment transport, abundant small wood debris at surface, piece of banding, active sediment transport.
40A	A	Soft, gray, slightly sandy silt with abundant methane bubbles throughout sediment column, methane near SWI from upward migration, organic particles interspersed throughout sediment column, RPD depositional, feeding void upper mid left, station is depositional
40B	C	Soft, organic, gray silt with abundant small dark organic particles interspersed throughout sediment column, irregular surface, subtle RPD contrast and gradation between oxidized sediment and underlying reduced sediment, depositional.
40C	A	Soft organic gray silt with minor fine sand near SWI, RPD depositional, subtle RPD contrast, abundant small methane pockets 9.4 cm below SWI to bottom of frame. Station is depositional.
40D	C	Sorted medium brown sand with patch of silt at left, surface washed, active sediment transport, RPD > penetration.
40E	B	1.9 cm layer of sorted fine sand overlying poorly sorted silt fine sand, buried RPD, relict RPD 4.3 cm thick, sediment column is very organic, top layer is recent deposition that has been resuspended, abundant floccs in water column, depositional, nice pic, unusually organic.
41A	C	Intensively bioturbated mottled silt/clay, abundant voids in upper 5 cm of sed column, possible dredge cut due to mottled organic silt/clay with downward colonization, biological well-defined RPD, good contrast, possible report pic.
41B	A	Slightly sandy, gray silt with tubes at SWI, biological RPD measure and can be differentiated from deposition induced extent of oxide-coated particles. Layer of fine, poorly sorted sand 12.5 cm below SWI, station is depositional, sand layer denotes a past period of higher flow.
41C	C	Poorly sorted, gray silty, fine to medium sand with nice tubes at the SWI (right), surface winnowed and small (0.5 cm) bedforms present, RPD physically controlled, nice pic, unclear whether erosional or depositional but sediment transport occurring here.
41D	C	Poorly sorted sandy silt with two methane voids 6.3 and 11.2 cm below SWI, irregular surface, RPD is and estimate as contrast is subtle and lower boundary ill-defined, abundant small organic particles interspersed throughout sediment column, depositional.
42A	B	Gray, organic silt, with abundant large and small methane pockets 6.3 to 14.5 cm below SWI, highly methanogenic, organic band 9 cm below SWI, depositional, RPD is well-defined and appears dominantly biological.
42B	C	Gray, highly methanogenic silt.clay, abundant large and small methane vesicles throughout sediment column, surface disturbed with abundant organic litter at SWI, highly organic and depositional.
42C	C	Poorly sorted silty fine to medium sand, surface shows evidence of winnowing, RPD contrast good but RPD seems physically induced, area of sediment transport, wood debris (stick) in background lying on sed surface, small scale broad bedform.
42D	C	Water shot, no penetration, on debris all reps, possible submerged piles.
42E	B	Well sorted light fine sand, beautiful arcuate bedform, active sediment transport, excellent pic, RPD physical in origin.
43A	A	Moderately sorted silty fine sand, organic-rich, abundant large and small methane vesicles throughout sediment column, bedform at surface, RPD physically generated with thickening in bedform trough and thin at ripple crest, excellent pic, depositional.
43B	C	Coarse and to gravel, mantle of fine detritus, either and input of gravel or periodically erosional.
43C	C	Gray sandy silt overlying sorted fine sand at depth, sand layer 8.3 cm below SWI and continues to bottom of frame, nice tubes at SWI in center, RPD influenced by both depositional and biological processes. Subtle RPD contrast.
43D	B	Gravelly coarse sand, surface washed free of fines, sediment transport/erosion, sediment appears to be a lag deposit.
43E	B	Poorly sorted, tan silty fine sand overlying gray silt/clay, contact between sand layer and underlying silt/clay is distinct, sand layer 3.5 cm thick, stick in background, RPD due primarily to physical processes and bottom limit of RPD subtly defined, area of periodic sediment transport, unclear whether old dredge cut.
43F	C	Thick layer of sorted light hued fine sand overlying gray clay/silt, sand layer 10.4 cm thick, similar in general appearance to 43E, contract between silt and sand distinct, possible old dredge cut?, unusual pic. Void at bottom center of pic.
44A	A	Thick layer of sorted light hued fine sand overlying gray clay/silt, sand layer 9 cm thick, similar in general appearance to 43E and F, contract between silt and sand distinct, possible old dredge cut?, unusual pic, thick mantle of tan silt at surface that defined the RPD.
44B	B	gray fine to medium sand,
44C	A	Exceptionally well-sorted coarse sand, light hued, leaf in background, nice bedform with 3.1 cm amplitude, sediment transport area.
44D	B	Minimal penetration, hard and/or sloped bottom, only small sliver of sediment at right, likely on wood debris.
44E	C	Very well sorted medium sand, light hued, surface free of fines, sediment transport area, nice pic, sand is unconsolidated.
45A	C	Well sorted medium sand with lens of fine grained sediment near SWI, surface washed of fines, RPD physical and defined by the limit of fines in the sediment column, sand is dark in hue, area of sediment transport.
45B	B	Gray, slightly sandy silt overlying well-sorted fine to medium dark sand, fine tubes at SWI, RPD thin and biological, sand layer 10.9 cm below the SWI and continues to bottom of frame, presently depositional but basal sand suggest periodic sediment transport
45C	C	Layered, dark gray silt fine to medium sand, small tubes at SWI, top layer is 6.9 cm depositional sequence consisting of basal sorted medium sand and fining upward to a mixed silt and sand, bottom unit is similar, RPD physical in origin (resuspension + deposition), nice pic.
45D	C	Gray, soft, slightly sandy silt, abundant feeding voids, two distinct layers, top silt layer lighter gray and is 10.1 cm thick, lower layer from 10.1 cm to bottom of frame and consists of organic, medium gray silt with abundant small methane vesicles, methane present from 9.2 cm below SWI to bottom of frame, RPD depositional, very nice slide showing 10.1 cm of recent deposition (possible annual cycle).
45E	B	Gray, soft, slightly sandy silt with two feeding voids lower right, large red worm lower left 12.5 to 15,5 cm below SWI, RPD depositional, station is depositional.
46A	A	Very well-sorted, light-hued sand, RPD delimited as band of tan, oxide-coated sand at SWI, area of sediment transport.
46B	A	Poorly sorted gray silty fine sand, dense, RPD depositional and likely an overestimate.
46C	B	Water shot, no penetration, on debris all reps, possible submerged piles.
46D	B	Tan fine sand overlying gray firm clay, evidence of sediment resuspension at SWI, RPD physically formed, void at lower center of frame, sediment transport area.
46E	C	Soft, gray, bioturbated, slightly sandy silt, numerous well-formed feeding voids throughout sediment column, RPD dominantly biological with decent contrast and defined bottom limit. Station is depositional.
46F	A	Very similar to 46E, comparable benthic conditions.
47A	C	Soft, sandy gray silt, very high surface relief, RPD depositional, small red worm upper center of frame, abundant small methane vesicles 6.2 cm below SWI to bottom of frame, small tube at SWI, station is depositional.
47B	A	Soft, gray, slightly sandy silt with numerous feeding voids in upper half of sediment column, methane vesicles abundant and small 12.8 cm below SWI to bottom of frame, subsurface silt becomes darker gray and more organic rich 12.5 cm below the SWI and likely represents a different depositional cycle, methane vesicle restricted to the lower organic silt layer and feeding voids restricted to upper, recently deposited layer, excellent pic showing cyclical deposition, station is highly depositional.
47C	A	Well to poorly sorted fine to medium brown sand, flaser bedding, active sediment transport, surface washed.
47D	A	Poorly sorted fine stiff sand, RPD physical, area of past sediment transport, small scale bedforms at surface, SWI shows evidence of previous winnowing.
47E	A	Moderately sorted fine brown sand with thin layer of silt and floccs at SWI, layer of fines defined the RPD, Bedform, evidence of past sediment transport.
48A	B	Soft, gray, slightly sandy silt with abundant small methane vesicles 9.6 cm below the SWI to the bottom of the frame. RPD contrast is subtle and RPD appears depositional in nature.
48B	B	Soft, gray sandy silt with few large methane vesicles 9-13 cm below the SWI, high surface relief that appears biological, abundant tubes at SWI in left background, deep well-defined RPD, depositional.
48C	A	Very soft, gray, slightly fine sandy silt with abundant small methane vesicles 14.4 cm below SWI to bottom of frame, series of voids at left of frame, RPD primarily depositional in origin, and 1.6 cm thick depositional intervals can be seen in RPD. Station is highly depositional.
48D	B	Soft gray sandy silt overlying moderately sorted silty fine to medium dark gray sand, sand layer 12.3 cm below the SWI and extends to the bottom of the frame, abundant large (>1 cm) oxidized mudclasts at the SWI, void lower mid frame, depositional sequence-possible annual cycle.
48E	A	Gray silt with deep RPD, large stick protruding from sediment and has hindered penetration, organic material in sediment column, void within RPD in upper right. Station appears strongly depositional.
48F	B	Sandy gray silt, large surface relief and appears to be biological in origin with modification by physical forces, recent deposition in RPD at left of mound crest, voids and burrows present in subsurface sediment, nice pic, depositional based on the recent lens of sediment at left of frame.
49A	A	Sandy gray silt with large methane pockets in a linear band 6.8 to 9.3 cm below the SWI, physical surface relief with very nice tubes in background, RPD a mix of physical (pressure irrigation) and biological processes. Nice Pic, station appears depositional.

Station/ Rep		Comments
49B	A	Gray, organic, sandy silt, abundant organic particles interspersed throughout sediment column, voids at left and right of frame, RPD both biological and depositional, worm lower left, station appears depositional.
49C	B	Very soft, gray slightly sandy silt with abundant small methane bubbles 10.4 cm below the SWI extending to the bottom of the frame, highly depositional, overpenetration in upper left, RPD is area average and therefore represents a minimum RPD.
49E	A	Sorted very fine gray sand, RPD is physical in origin, two small worms in subsurface sediment, area of sediment transport.
49F	B	Gray, sandy silt with void in lower left and minor small methane vesicles 8.3 cm below the SWI to the bottom of the frame, surface sediments are much sandier than the subsurface sediments. Unclear whether erosional or depositional.
50A	A	Soft, gray sandy silt, two small voids, minor small methane vesicles at lower left 11.3 cm below the SWI extending to the bottom of the frame, depositional.
50B	A	Very soft, gray, slightly sandy silt with dragdown of fabric at right, low-contrast depositional RPD, abundant small methane pockets 12.6 cm below the SWI extending to the bottom of the frame, highly depositional.
50C	C	Poorly sorted silty fine to medium sand, worm lower left, station appears static, firm sand.
50D	C	Very soft, slightly sandy silt with minor small methane pockets 16.7 cm below the SWI, worms at lower left of frame 13.9 to 20 cm below the SWI, RPD depositional, small voids at left and center of frame, void in center is relict and filled, station is highly depositional.
50E	A	Very soft, gray, organic, sandy silt with abundant small methane pockets 12.3 to 20.5 cm below the SWI, small void in middle of frame, RPD contrast is low and RPD is primarily depositional in origin, station is highly depositional.
51A	B	Unusual poorly sorted, layered, silty fine sand, buried oxidized sediment, individual depositional layers readily visible and range in thickness from 2.6 cm to 8.2 cm within a single layer, each layer is defined by a fining upwards sequence, highly depositional, appears that each layer was draped over an irregular surface, also appears to be an area of both deposition and sediment transport, worm lower left 11 cm below the SWI, RPD is defined by the silt lens at the SWI.
51A	C	Tan silt overlying well-sorted fine to medium sand, SWI shows evidence of sediment resuspension, burrow structures at base of surficial silt layer, area of periodic deposition and sediment transport, nice pic.
51B	A	Very soft, gray, slightly sand silt with abundant large and small methane pockets in the subsurface sediment 9.6 to 20 cm below the SWI, RPD depositional in origin, organic band 9.4 cm below SWI and is <1 cm thick. Station is highly depositional.
51C	A	Overpenetrated, highly depositional, soft gray silt with abundant methane pockets 13.9 cm to 21.2 cm below top of frame, RPD depositional, relict void lower right.
51D	B	Soft gray slightly sandy silt with void in center of frame and few moderately sized methane pockets 13.5 to 19.1 cm below the SWI, RPD contrast is subtle and RPD is primarily depositional in origin although there is a biogenic mound at the SWI in the center of the frame, few small tubes at SWI, station is highly depositional.
51E	A	Soft, gray, bioturbated silt with numerous feeding voids and very minor small methane pockets 9.6 cm below the SWI extending to the bottom of the frame, RPD is biological and the bottom contact is well-defined, worm at left mid-frame, station is depositional but rate appears less than other stations.
51F	B	Light gray silt, large surface relief, RPD contrast subtle and lower contact is gradational, physically controlled RPD, small worm lower left of frame, likely depositional.
52A	B	Organic, gray slightly sandy silt with abundant methane 7 cm below SWI to bottom of frame, pockets are both large and small, abundant organic particles in the RPD, RPD appears depositional, station is highly depositional.
52B	A	Overpenetrated, gray slightly sandy soft silt, abundant large and small methane pockets from the SWI down to the bottom of the frame, worm 10.7 cm below the top of the frame, RPD appears depositional, station appears highly depositional.
52B	D	Soft organic gray silt with deep depositional RPD, abundant small organic particles in sediment column, void next to large methane pocket and at right, moderate small to large methane pockets 10.75 cm below the SWI and extending to the bottom of the frame, station is depositional.
52C	A	Gray sandy silt over poorly sorted dark gray silty fine sand, tube at SWI, depositional, RPD contrast is subtle and an artifact of the burial of oxidized particles with deposition.
52D	B	Gray, very sandy silt with very minor small methane pockets at lower left 13.5 cm below the SWI, bands of sorted fine sand throughout sediment column which demarcate the basal unit of a depositional sequence, each unit varies in thickness from 2-5 cm, station is depositional with periodic sediment transport.
52E	B	Dark sorted fine to medium sand overlying gray silt/clay, methane pockets at contact between sand and clay 7.8 to 10.8 cm below SWI, void at very left of frame, contact between sand and silt very distinct, evidence of sediment transport at the SWI, RPD defined by the presence of silt in the upper sediment column, depositional with periods of sediment transport.
53A	B	No penetration, likely debris, wiper not in frame so carriage descended.
53B	A	Sort, gray slightly sandy silt with abundant small methane pockets 9 cm below the SWI to the bottom of the frame, RPD depositional, station is highly depositional.
53C	A	Tan oxidized silt overlying cohesive clay, voids appear due to clay clump dragdown, very unusual, possible dredge cut.
53C	C	Tan silt overlying gray silt/clay, high surface relief, voids in upper right within the RPD, depositional.
53D	C	Gray, very sandy silt, void in lower left, surface is sorted fine to medium sand and show2s evidence of resuspension, pockets of sorted sand in sediment column but not in discrete layers, thick RPD that is both biological and physical in origin, worm in lower right of frame 15 cm below SWI, station is depositional although there is evidence of periodic sediment transport/resuspension.
53E	A	Gray, slightly sandy silt with nicely developed feeding voids in lower left and right of frame, pockets of methane 12.1 to 16.2 cm below the SWI, RPD depositional with pelletal surface and shallow burrows, station is highly depositional, RPD depositional.
54A	A	Tan to gray slightly silty, moderately sorted fine to medium sand, very well sorted 0.8 cm thick layer of sand at SWI indicating sediment resuspension winnowing and transport, RPD is defined by the extent of fines into the sediment column, station is in area of sediment transport.
54B	B	Gray silt, thinly developed RPD with good contrast, RPD biological, stiff mud, surface bioturbation, unclear whether depositional, no sediment transport/resuspension features.
54C	B	Gray, sandy silt with well-developed feeding void mid left, small methane pockets 10.5 and 14.1 cm below the SWI, RPD biological, normally graded depositional sequence readily apparent in upper sediment column, layer is 6.7 cm thick, station is depositional.
54D	A	Soft, gray, slightly sandy silt with well developed voids in center and right center of frame, wood particle in RPD, RPD depositional, station is highly depositional.
54E	C	Gray, organic, fine sandy silt with voids mid right and mid left, top 9.1 cm of silt is more organic in appearance than underlying light gray silt/clay, methane pockets 10.1 cm below SWI to bottom of frame and are exclusively in the underlying light gray silt, worms appears to be mining pockets of organics in the upper layer, RPD appears depositional with very subtle RPD contrast, station is depositional and upper layer may be discrete depositional interval.
55A	A	Poorly sorted silty fine sand, hard packed, top 0.3 cm is sorted and shows evidence of resuspension, RPD physical in origin, veneer of fines at the SWI, area of periodic deposition and sediment transport.
55B	C	Very soft, gray silt, overpenetration, voids in center of frame, abundant small methane vesicles 12,3 cm below the top of frame extending to the bottom of the frame, top 12.4 cm of sediment light gray, underlying silt is more organic and the methane vesicles are concentrated in this layer, highly depositional.
55B	D	Soft tan to gray silt, deep depositional RPD, void/burrow in center SWI and small void lower right, 1.63 cm layer of recently deposited tan silt at SWI, station is highly depositional.
55C	B	Soft, light gray slightly sandy silt with large well developed feeding voids, 1 small methane vesicle 16.6 cm below SWI, station is depositional.
55D	A	Soft, well-bioturbated, gray silt with abundant large well-formed feeding voids, methane vesicles in lower left corner 13.1 cm below the SWI to the bottom of the frame, station is depositional, biological RPD.
55E	A	No penetration, likely debris, all 3 reps similar, silt veneer apparent in background.
56A	B	Gray, very sandy silt with wood fragment at SWI and abundant small methane vesicles 9cm below the SWI to the bottom of the frame, sediment is organic-rich, worm in lower center 13.6 cm below the SWI, surface shows evidence of resuspension but station appears dominantly depositional.
56B	B	7 cm layer of well sorted, light fine to medium sand overlying gray silt/clay, contact between two layers is well-defined, RPD is depositional and is delimited by the extent of recently deposited surface fines into the sand layer, area of sediment transport and deposition.
56C	C	Soft gray, organic, slightly sandy silt with organic fragments in RPD, filled void in middle of frame, small methane pocket at lower right 19 cm below the SWI, station is highly depositional.
56D	A	Gray, well-bioturbated silt with well-developed feeding voids at depth, red worm in center of frame 5.8 cm below the SWI, RPD is biological with good contrast and definition from underlying reduced sediments. A good example for showing the difference between a depositional and biological RPD. Stations appears net depositional but at a slow rate based on the RPD.
56E	C	Gray, soft silt with discontinuous RPD that is a result of mudclast smear down, abundant oxidized MC at SWI, void/burrow at bottom of frame, depositional.
56F	C	Poorly sorted silty fine to medium sand, RPD depositional, leaf buried in center of frame, irregular surface, disturbed, likely debris in background, abundant organic particles.
57A	C	Homogeneous, gray silty fine sand, RPD depositional and contrast is subtle at lower bound, fine tubes at SWI, nice pic, depositional.
57B	A	Overpenetrated, soft gray slightly sandy silt, abundant large and small methane pockets 9.8 cm below the top of frame extending to the bottom of the frame, RPD looks depositional, station is highly depositional.
57B	D	Soft tan to gray silt with void in lower right-center, small methane pocket in lower left 12.47 to 12.72 cm below the SWI, deep depositional RPD with subtle contrast, oxidized mudclasts at SWI, station is highly depositional.
57C	A	Soft gray sandy silt, well-developed RPD with abundant small tubes at the SWI, three red worms in subsurface sediment 10.1, 11.2 and 16.2 cm below the SWI (from left to right), RPD biological with some physical input, good contrast, station is slowly depositional.
57D	B	Gray sandy silt with feeding void at lower left of frame, floccular and depositional RPD, faint layering of fine sand with 5.24 cm and 3.45 cm depositional intervals, station is depositional.
57E	A	Firm gray silt with feeding voids/burrows in center and left, biogenic aggregate at SWI, biological RPD and RPD is uniform, homogeneous fabric, station appears slowly depositional.
57F	B	Gray slightly sandy silt with small feeding void at very lower right, floccular RPD that appears to be dominantly depositional, uniform fabric in subsurface sediment, station appears slowly depositional.
57G	A	Soft gray slightly sandy silt with low contrast depositional RPD, abundant small subsurface methane pockets 10.62 cm below the SWI and extending to the bottom of the frame, station is depositional, relict void in lower right center.
58A	A	Poor to moderately sorted fine sand overlying gray silt, wood fragments at SWI, abundant subsurface methane 9 cm below the SWI to the bottom of the frame, methane concentrated at interface between sand layer and underlying silt, thin 0.3 cm layer of sorted sand at the SWI indicative if sediment transport, sand layer shows evidence of multiple depositional layers based on fining upwards sequences, layers (from top to bottom) are 3 cm, 2.9 cm, 2.5 cm and 3.5 cm thick, station is depositional.
58B	B	Gray slightly sandy silt with abundant large and small methane pockets 4.6 cm below the SWI to the bottom of the frame, voids mid right and upper mid-left, station is depositional, RPD is dominantly biological with good contrast.
58C	A	Soft, gray slightly sandy silt, voids mid right and lower left-center, depositional RPD with dark fine sand at bottom contact which has also been seen in other highly depositional stations, methane pockets in lower right corner 17.2 cm below the SWI, lens of moderately sorted medium gray fine sand between 15.8 cm and 19.3 cm below the SWI (3.5 cm thick).
58D	A	Soft, gray sandy silt with very minor small methane pockets 16.1 cm below the SWI to the bottom of the frame, small;; shell fragments in the RPD, RPD dominantly depositional and fine sand can be seen at bottom of RPD, few very small tubes at SWI, station is highly depositional.
58E	B	Gray sandy silt with depositional RPD, void at lower right, subsurface methane pocket at very lower right 10.87 cm below the SWI and extending to the bottom of the frame, tubes at SWI, black sand particles chaotically interspersed throughout the sediment column and may be sandblast grit, station appears depositional.
58F	A	Uniform gray organic silt with depositional RPD and organic debris at SWI, bedform, station appears to be slowly depositional.
59A	A	Poorly sorted, gray fine sand, methane pockets 10.1 cm below the SWI to the bottom of the frame, RPD is depositional with subtle contrast at the lower limit, station appears depositional.
59B	C	Sorted lens of dark gray medium sand over poorly sorted, firm silty fine sand, resuspension at the SWI, MC in left background, area of sediment transport, very stiff bottom.
59C	A	Soft, gray, slightly sand silt with abundant small methane pockets 8.5 cm below the SWI to the bottom of the frame, subsurface sediment is more organic (darker gray) at the bottom of the frame, RPD depositional with subtle gradational contrast at bottom of the RPD, station is depositional, possible faint depositional intervals at 4 cm spacing.
59D	A	Soft medium gray, slightly sandy silt overlying 2 cm basal layer of dark gray sorted fine sand, abundant small methane vesicles in upper silt layer 8.2 to 17.4 cm below the SWI, contact between basal sand and upper silt if distinct and upper sand layer is riddled with methane, RPD distinctly depositional, station is highly depositional.
59E	A	Gray sandy silt, methane pocket at mid-left bottom of frame, voids in lower center of frame, surface is sorted and shows evidence of resuspension, RPD depositional and partly biological (based on contrast), station appears depositional.
59F	A	Gray slightly sandy silt with subsurface feeding voids in center and lower right of frame, small subsurface methane pocket 13.54 to 13.87 cm below the SWI, depositional RPD with subtle RPD contrast at lower bound, some biological contribution to RPD, tube at left SWI, red worm in center of frame 8.27 to 9.15 cm below the SWI, station is depositional.
60A	A	Very soft, gray slightly sandy silt with abundant small and large methane pockets, upwards ebullition of methane as vesicle is in RPD and many are trapped in feeding voids, RPD depositional and has thin, faint layer of brown fine sand at bottom, large network of feeding voids, minor small tubes at surface, relief is biological, station is highly depositional.
60B	C	Very soft gray silt, slight overpenetration, abundant large methane voids at depth 7.9 below the SWI to the bottom of the frame, cake-better texture indicating high water content, highly depositional.
60B	E	Soft tan to gray silt with well developed feeding void in lower right, deep depositional RPD with subtle contrast, oxidized mudclasts at SWI, station is highly depositional.
60C	C	Gray silty fine sand with minor methane voids 13.9 cm below the SWI, lens of sorted fine dark sand 12,6 cm below the SWI and 2.6 cm thick, tubes at SWI, RPD contrast is subtle and appears dominantly depositional/physical, station is depositional.

Station/ Rep		Comments
60D	A	Gray, bioturbated silt, biogenic aggregate at SWI, abundant well-formed voids, worm at left, depositional, RPD biological.
60E	A	Gray slightly sandy soft silt with feeding voids in center of frame, one feeding void methane filled, abundant subsurface methane pockets 10.39 cm below the SWI and extending to the bottom of the frame, surface relief biological, RPD dominantly biological, station is depositional, small tubes at SWI.
61A	A	Soft gray slightly sandy silt with abundant small methane pockets in subsurface sediment 7.3 cm below the SWI extending to the bottom of the frame. Small void in mid right, large red worm in lower center of frame 12.6 to 14.6 cm below the SWI, nice tubes at SWI, biogenic aggregate at SWI, depositional. RPD biological.
61B	A	Soft gray slightly sandy silt with very deep and uniform RPD, high natural surface relief, subsurface methane with a few very large pockets, methane is 11.3 cm below the SWI and extends to the bottom of the frame, large red worm 14.1 to 17.7 cm below the SWI, station is depositional.
61C	A	Soft gray silt, with minor small to medium methane pockets 13.8 cm below the SWI and extending to the bottom of the frame, deep RPD, dense tubes at left, voids lower left center of frame, RPD biological, station is depositional, traces of oxidized burrows at left.
61D	C	Sorted, dark, medium sand with veneer of silt at the SWI, bedform, area of sediment transport. Very dark sands are likely anthropogenic in origin.
61E	D	Soft tan to gray silt with feeding void in mid-right of frame, tubes at SWI in background, subsurface methane 7.09 cm below the SWI and extending to bottom of frame, methane present in large pockets, very loose floccular RPD, RPD both biological and depositional in origin, station is highly depositional.
62A	B	Gray, sandy silt with abundant small particles of organics interspersed throughout the sediment column, few large methane pockets at depth 12.0 cm below the SWI, RPD contrast is subtle and appears to be depositional in origin, possible depositional layer 7 cm below the SWI (bottom contact), small tubes at SWI.
62B	A	Soft, gray, organic silt with minor fine sand subcomponent, abundant large and small methane pockets 7.3 cm below the SWI extending to the bottom of the frame, biogenic aggregate at SWI, algae at right, abundant organic particles interspersed throughout the sediment column, highly depositional.
62C	C	Very soft, homogeneous, gray slightly sandy silt with minor small methane pockets 10.8 cm below the SWI extending to the bottom of the frame, RPD is depositional in origin and there is very subtle contrast, oxidized sediment from old burrow at depth, station appears highly and rapidly depositional.
62D	C	Firm tan silt with organic particles interspersed throughout visible sediment column, RPD greater than penetration, tube in water column, appears depositional based on the RPD, but unclear due to shallow penetration.
62E	A	Gray homogeneous silt with well developed biological RPD, numerous feeding voids at depth, minor small tubes and pellets/floccs at SWI, station is depositional, RPD depressed immediately above void in lower left center, surface relief biological.
63A	C	Dark to medium gray, organic silt with abundant very large to small pockets of methane, methane pockets 7.6 cm below the SWI and extend to the bottom of the frame, abundant organic particles interspersed throughout the sediment column, recent 0.2 cm layer of reduced sediment at the SWI, highly depositional station and highly organic.
63B	A	Overpenetrated, very soft, homogeneous gray silt, methane pockets 11.2 cm below the SWI and extending to the bottom of the frame, patch of organics at bottom of frame, small void upper left center, red worm 13.5 cm to 14.5 cm below the top of frame in lower left center of frame, RPD contrast is subtle and RPD appears depositional. Station appears highly depositional.
63B	D	Soft tan organic silt with shallow void in upper right, abundant small dark organic particles in upper sediment column, RPD > penetration, broken tube at SWI, RPD depositional, station is highly depositional.
63C	A	Gray sandy silt with distinct layering, abundant tubes at SWI, pocket of fine sand at SWI at right, top depositional layer is 10.5 cm thick, middle layer is 3.8 cm thick and bottom layer is 1.9 cm thick, in each layer the bottom contact is defined by dark gray silty fine sand and then proceed with a standard fining-upward sequence, very subtle RPD contrast, station is clearly depositional, minor small methane pockets at lower right 14.5 cm to 15.4 cm below the SWI.
63D	A	Gray silty fine sand with well-developed voids in lower and mid-right, RPD a result of both biological and physical processes, station appears to be depositional but in an area of sediment transport.
63E	A	Soft gray silt with numerous small subsurface feeding voids at center of frame, small patches of organic subsurface in lower left center, tubes at SWI, RPD a combination of biological and depositional processes, station is highly depositional.
64A	A	Very soft gray slightly sandy silt, overpenetrated, abundant small to medium pockets of subsurface methane 6.8 cm below the top of frame extending to the bottom of the frame, RPD is distinctly depositional based on contrast and bottom contact, red worm in lower right 17.1 to 18.7 cm below the top of frame. Station is highly depositional.
64A	D	Soft tan to gray silt with feeding void lower right, small subsurface methane pockets 10.55 to 12.62 cm below the SWI, depositional RPD, station is depositional.
64B	B	Very soft, slightly sandy silt with abundant small methane vesicles 15.2 cm below the top of frame, overpenetrated, RPD is primarily depositional in origin based on contrast and bottom contact, band of dark fine sand 14.6 cm below top of frame and this appears to be basal member of a depositional layer. all methane is below this strata. Station appears highly depositional.
64B	E	Brown to tan slightly sandy silt, 4.38 cm layer of recently deposited brown sand y silt at SWI, RPD > penetration, abundant organic particles in recently deposited layer, nice pic.
64C	B	Sandy gray silt over well sorted dark, fine to medium sand, abundant tubes at SWI as well as a thin veneer of sand, prominent depression in middle of frame which is underlain by a large reticulated void complex, secondary colonization in flakes of depression, excellent pic, top silt layer is 8.8 cm thick.
64D	B	Well sorted fine to medium sand, light color of sand suggests native origin, surface washed of fines, area of sediment transport, insufficient fines in sediment column to discern a RPD, although light color of sand suggests that RPD > penetration.
64E	B	Soft tan to gray silty sand overlying gray homogeneous fine sandy silt, voids in lower left and have methane vesicles, subsurface in-situ methane pockets 12.87 cm below the SWI and extend to the bottom of the frame, minor small tubes at SWI, station is depositional.
65A	A	Gray slightly sandy silt with well-formed void in center of frame, subsurface small methane pockets 14 cm below the SWI to the bottom of the frame, relict RPD under present RPD denoting former SWI, top layer above relict RPD 5.9 cm thick, shallow void near SWI in center of frame, nice pic, station is depositional.
65B	C	Very soft, gray silt with small and large methane pockets 10.4 cm below the SWI extending to the bottom of the frame. Very deep, low contrast RPD that is likely depositional in origin, overpenetrated, station is depositional.
65B	E	Soft tan to gray silt with deep depositional RPD, RPD contrast subtle, station is depositional, relatively featureless mud.
65C	A	Homogeneous, firm gray silt with minor sand at SWI, erosional, RPD is thin skin at SWI, very odd station, perhaps recently disturbed.
65D	C	Well-sorted light hued medium sand, washed surface, RPD is precluded by lack of fines in upper sediment column, in reality the entire penetration depth may be oxygenated based on the light hue. Area or sediment transport.
66A	A	Tan silty fine sand overlying gray silt with small to medium methane pockets 8.9 cm below the SWI and extending to the bottom of the frame. Thin red worms in lower center and right center of frame, shallow, incipient voids in RPD, surface sand layer approximately 7.6 cm in average thickness although contact between sand layer and underlying silt is at an angle, small tubes at SWI, station appears depositional.
66B	C	Deep tan RPD with minor shallow voids near SWI overlying gray silt with methane channels, methane present 15.2 cm below the SWI and extends to the bottom of frame, Bottom contact of RPD well defined and RPD appears to be a result of both biological and depositional processes, station is depositional.
66C	C	Soft, organic, sandy silt with exceptionally deep RPD, red worm 16.3 cm to 17.8 cm below the top of frame, overpenetrated, highly depositional.
66C	E	Brown fine sandy silt with abundant organic particles at SWI, 2.57 cm layer of recently deposited silty fine sand at SWI, station is highly depositional, RPD > penetration.
66D	B	Gray, slightly fine sandy silt with two prominent voids in center of frame, dense well-formed tubes at left SWI, subsurface sediment is relatively homogeneous, nice pic, RPD biological, station appears depositional.
66E	B	Gray silty fine sand overlying gray silt, shallow voids in RPD at left of SWI, worm in mid-left center of frame, surface sand layer 10 cm thick, small-scale bedform at right SWI, area of periodic sediment transport.
66F	A	Veneer of tan silt overlying well-sorted medium sand, sand is light hued and appears native, RPD defined by the mantle of silt overlying the sorted sand, RPD deepest in the troughs surrounding the ripple crest in center of frame, nice pic, station is area of sediment transport with periods of quiescence.
67A	B	Poorly sorted silty fine to medium sand, bioturbated at right of frame, top 0.4 cm of sediment column washed free of fines, station is in area of sediment transport but is not kinetic enough to prevent the buildup of fines and the assimilation of fines into the sediment column.
67A	C	Poorly sorted dark fine sand overlying gray silt, prominent void complex in med left, laminar bed at SWI that is 1.1 cm thick and exceptionally well preserved, excellent pic, based on the increased sorting at the upper contacts of the two discernible sand layers the station is subject to periodic sediment transport and deposition, total thickness of the sand layers is 6.7 cm.
67B	A	Very soft, gray slightly sandy silt with abundant small methane vesicles 13.7 cm below the top of frame extending to the bottom of the frame, overpenetrated, very deep depositional RPD, station is highly depositional.
67B	E	Soft tan organic silt, abundant small dark organic particles interspersed throughout upper sediment column, 3.57 cm layer of recently deposited sediment at SWI, subsurface sediment fabric is uniform, station is highly depositional, RPD > penetration.
67C	A	Very soft slightly sandy silt, overpenetrated, homogeneous, exceptionally deep depositional RPD with subtle gradational contact at lower bound, station is highly and rapidly depositional.
67C	F	Soft tan to brown organic silt, abundant organic particles interspersed throughout sediment column, leaf litter at SWI, RPD > penetration, station is highly depositional.
67D	C	Homogeneous gray silt with tan sand veneer at left of frame, patch of sand at bottom of frame, methane pockets present 8.8 cm below the SWI and extend to the bottom of the frame, lack of developed RPD notable and appears to have been removed via disturbance, unclear whether station is erosional or depositional.
67E	B	Gray silty fine sand with prominent large void in left-center of sediment column, deep RPD and surface relief is biological, RPD is biological, interesting pic, appears that station is presently depositional.
68A	A	Gray, soft, slightly sandy silt with abundant small to medium methane vesicles 11.2 cm below the SWI and extending to the bottom of the frame, subsurface sediment homogeneous, oxic burrow trace in mid-left, RPD depositional, large methane escape bubble near SWI, station is depositional.
68B	B	Very soft gray slightly sandy silt with methane pockets 14.3 cm below the SWI and extending to the bottom of frame, methane is present in mostly small bubbles, RPD thick and highly depositional, contrast is low, overpenetrated, station is highly depositional.
68B	F	Soft tan to gray silt, scattered small organic particles in sediment column, station is highly depositional.
68C	A	Overpenetrated, brown soft silt, entire sediment column is composed of oxidized sediment, highly depositional.
68C	D	Brown organic slightly sandy silt with abundant organic and woody particles at SWI, 2.95 cm recently deposited layer at SWI, RPD > penetration, station is depositional.
68D	A	Gray fine sandy silt with abundant tubes at SWI and void at right, very minor methane present at bottom of frame 17.4 cm below SWI, RPD biological, station appears depositional.
68E	A	Hard, tan silty fine sand, minimal penetration.
69A	B	Poorly sorted medium and fine sand, deep RPD, organics mixed with sand, station appears depositional based on the lack of sorting and the assimilation of fines into the sandy matrix.
69B	A	Organic, gray, slightly sandy silt with subsurface methane pockets 8.9 cm below the SWI and extending to the bottom of the frame, void at far left and a methane filled void in left center, Biological RPD with biogenic aggregate at SWI, station appears depositional.
69C	A	Gray silt with deep RPD, subsurface methane pockets very minor and 11.6 cm below SWI and extending to the bottom of the frame. Contact between RPD and underlying reduced sediments is distinct although contrast is low, algae near SWI at right, station appears depositional.
69D	C	Fine sand veneer over slightly sandy gray silt, surface layer of brown sorted fine sand varies from 0.3 to 2.5 cm in thickness, band of dark fine sand 14.4 cm below the SWI and this denotes the basal member of a depositional unit, subsurface methane pockets 16.8 cm below the SWI and extending to the bottom of the frame, small tubes at the SWI, station is highly depositional.
69E	A	Soft, sandy, gray silt with shallow void near SWI in center of frame, very minor methane at bottom of frame, two small red worms at depth 12.1 to 16.9 cm below the SWI, deep RPD, station is highly depositional.
70A	A	Very soft gray silt, overpenetrated, abundant large methane pockets at depth 14.7 cm below the top of frame and extending to the bottom, homogeneous mud, highly depositional.
70A	E	Soft tan organic silt, RPD depositional and > penetration, tube at SWI, station is highly depositional, organics interspersed throughout sediment column.
70B	C	Very soft brown to gray sandy silt, overpenetration, exceptionally deep RPD, buried algae piece, highly and rapidly depositional, organics.
70B	E	Brown sorted organic fine sand over tan silt, abundant organic particles at SWI, void in center, bedforms in sand, sands are transgressive over rapidly deposited organic oxidized silts, unusual pic.
70C	A	Poorly sorted fine sand overlying gray silt, top sand layer is 8.2 cm thick and contact between sand and underlying silt is sharp, deep well-defined RPD with good contrast, tubes left, top layer is a distinct depositional unit (annual?). Nice pic.
70D	A	Debris-lade sandy silt, abundant pieces of woody debris and other organics, near 100% cover, appear depositional based on the silt mantle.
71A	B	Gray sandy silt with active feeding voids at right and left center, RPD is thickest above left-center voids and physically controlled elsewhere in photo, pockets of fine sand at bottom of frame, nice pic of benthos modifying a physically dominated RPD, unclear whether depositional.
71B	C	Very soft, gray sandy silt with two feeding voids subsurface, small minor methane pocket at bottom of frame, contact between more organic top silt layer and underlying silt 14.5 cm below top of frame, top layer is a distinct depositional unit, station is highly and rapidly depositional.
71B	G	Tan to light gray slightly sand silt, center of SWI enriched in fine sand relative to the rest of frame, deep low contrast depositional RPD, station is depositional, tube at SWI.
71C	B	Silt stirred up by camera, on debris or other hard object, object is silt-mantled and is likely a depositional area.
72A	C	Poorly sorted, silty dark fine to medium sand, hard packed, surface is washed, area of sediment transport, dark color of sand suggests they are anthropogenic in origin.
72B	A	Odd, brown to tan humic sandy silt, organic detritus at SWI, prominent burrow in right center, loose organic sand layer at SWI 2.1 cm thick, highly organic and appears almost soil-like. Depositional.

Station/ Rep		Comments
72C	B	Water shot, all rep have no penetration, on piles or debris.
73A	C	Sandy, gray silt with feeding void in lower center of frame, some shallow voids within RPD, RPD appears biological, subsurface sediment is homogeneous.
73B	C	Very soft, tan and gray silt, very deep depositional RPD, station is highly depositional, overpenetrated, minor methane pockets 16.3 cm to 17.8 cm below top of frame.
73B	F	Light tan fine sandy silt, RPD depositional and RPD > penetration, upper sediment column is slightly sandier than rest of column, possible 5.45 cm recently deposited sediment interval based in subtle grain size shift, station is highly depositional.
73C	A	Firm, sandy gray silt, SWI appears sandier than subsurface sediment, small mudclasts at SWI, small tubes at SWI, RPD is highly invaginated and appear biological from downward colonization, possible area of sediment transport as subsurface sediment looks like it was recently exposed.
73D	A	Very soft, poorly sorted silty fine sand, abundant organic particles in upper RPD, worm at left 10.5 to 11.1 cm below the SWI, RPD very deep and appears primarily depositional, Distinct band of fine sand in RPD 4.1 cm below the SWI and appears to be due to recent deposition, the absence of methane the layering in the RPD suggests that this station is both highly and rapidly depositional.
73D	C	Very soft, poorly sorted, organic, silty fine sand, prominent voids lined with oxidized sediment in center of frame, very deep RPD with abundant organic particles in upper part of RPD, faint sand layer in RPD 4.4 cm below the SWI, very similar to rep A but with exceptionally well-developed voids, highly and rapidly depositional.
74A	E	Very soft tan and gray slightly sandy silt, subsurface methane (small and minor) 19 cm below SWI and extending to the bottom of the frame, overpenetrated, highly depositional and RPD is deep and depositional in origin.
74A	F	Light tan organic silt, very deep RPD that is depositional in origin, two discernible depositional intervals at SWI, top interval at SWI and is 1 cm thick, immediately under top interval the second interval is 1.65 cm thick and has a subtle fining upwards sequence, station is highly depositional.
74B	C	Brown fine sand overlying light brown organic sandy silt, organism in lower right along with mixed sand and silt from burrowing activity, organic particle including a fir needle interspersed throughout sediment column, sediment has an odd humic look to it, highly and rapidly depositional, similar to 72B.
74B	E	Melange of sorted fine sand and leaves, recently deposited, tan silt at bottom of frame, disturbed from penetration, station is depositional as sand/leaf mixtures is interpreted to be transgressive.
74C	B	Sorted dark medium sand overlying firm gray silt, RPD buried by advancing sand (rather than lag) as evident in ripple on right, excellent picture, area of sediment transport and flux.
74D	B	Brown, slightly sandy organic silt, abundant organic debris buried 9.8 cm below the SWI and extending to bottom of frame, sediment had add humic appearance, appears highly depositional, RPD greater than penetration due to deposition.
75A	D	Soft, poorly sorted silty fine sand with very deep depositional RPD, veneer of sorted fine sand at SWI, thin red worm in lower left-center 11.3 to 12.9 cm below the SWI, station is similar to 73D, rapidly and highly depositional.
75B	C	Soft, poorly sorted silty fine sand with a 0.6 cm veneer of sorted fine sand at the SWI, deep depositional RPD, very similar to but slightly fine grained than 75A and 73D, rapidly and highly depositional.
75C	B	Washed gravelly coarse sand lag, high energy, sediment transport, nice pic.
75D	D	Hard packed, poorly sorted tan, silty fine sand, station appears more silty than it really is, RPD>penetration, area of sediment transport.
75E	E	Firm tan silt with abundant organic particles interspersed throughout the sediment column, similar to 75D but finer grained, RPD>penetration, relief appears to be a bedform and penetration is at an angle.
76A	A	sorted fine sand over tan silt over poorly sorted silty fine sand, silt is buried RPD and is included in RPD measurement, surface progradational sand is 4.8 to 6.2 cm thick. Highly and rapidly depositional, excellent photo.
76B	A	Sorted fine to medium sand with clots of silt at right, minor small gravel, bedforms, area of sediment transport, nice picture.
76C	A	No penetration in all reps from this station, on debris or submerged piles/lines.
77A	B	Well-sorted oxidized sand overlying gray, organic poorly sorted silty sand, void upper right, bedforms at surface, subsurface methane in lower left 6.2 to 9.7 cm below the SWI, thin red worm in mid-right 7.4 cm below the SWI, organic particles interspersed throughout the gray subsurface sediment, some organic litter in foreground at the SWI, sediment transport and deposition.
77B	A	Washed, sorted fine sand over organic, poorly sorted sandy silt with abundant particles of organic material interspersed throughout the sediment column, abundant subsurface methane in small to medium sized pockets 2.8 cm below the SWI extending to the bottom of the frame, surface looks erosional, RPD not discernible (washed away?).
77B	C	Washed fine sand overlying poorly sorted, organic, sandy silt, RPD is a combination of oxidized silt and fine sand, SWI is washed, sand is transgressive over the organic silt and this is an area of sediment transport, subsurface methane pockets, abundant small pieces of organic detritus interspersed throughout sediment column.
77C	A	Washed coarse sand, area of sediment transport, minimal penetration.
77D	C	No penetration in all reps from this station, on debris or submerged piles/lines.
78A	A	Tan organic sandy silt overlying a thin sliver of gray silt at the bottom of the frame, very deep depositional RPD, abundant pieces of organic litter interspersed throughout RPD, 1.3 cm lens of fresh deposition at the SWI, station is highly and rapidly depositional.
78B	A	Poorly sorted coarse sandy gravel with organic litter at SWI, area of sediment transport, gravels are rounded streambed gravels.
78C	A	Well sorted medium to coarse sand, bedforms, wood debris in ripple trough, area of sediment transport, lack of fines precludes RPD, sand appear to be rounded.
78D	B	Gravel and cobble lag, no penetration due to rocky cobbles, large rounded gravels and cobbles visible in foreground and measurements made on these.
79A	A	Well sorted brown fine sand overlying tan silt, transgressional sand bedform at SWI and is 2.1 to 4.4 cm thick, contact between silt and sand distinct, area of sediment transport, really nice slide.
79A	C	Well sorted brown sand overlying sandy organic gray silt, possible crayfish burrow from left to right, top sand layer 2.1 to 4.2 cm thick and is transgressing over the silt, RPD buries, area of sediment transport and deposition, nice pic.
79B	C	On debris, twig or metal piece visible at bottom of frame, all 3 reps from this station were on impenetrable debris.
79C	B	No penetration in all 3 reps from this station, likely on debris.
79D	B	No penetration except for a small piece of wood debris at lower right, no penetration in other reps from station, on woody debris.
80A	C	No penetration, some floccs in water column, likely on debris, no penetration in all 3 reps.
80B	B	No penetration, some floccs in water column, likely on debris, no penetration in all 3 reps.
80C	B	Transgressive, well-sorted fine to medium brown sand overlying poorly sorted gray silty fine sand, RPD buried by advancing sand, amazing photo of advancing bedform, area of significant sediment transport.
80D	B	No penetration in any of three reps at this station, some floccs in water column and faint outline of large piece of wood debris in far background, turbid water.
81A	A	No penetration in any of rep from this station, floccs in water column, turbid, likely on debris or hard substrate.
81B	C	No penetration in any of rep from this station, floccs in water column, turbid, likely on debris or hard substrate, cobble or wood debris in background.
81C	A	Poorly sorted fine sandy gravel, rounded gravels, possible macrofaunal burrow at lower right, area of sediment transport, substrate is a lag deposit.
81D	B	Minimal penetration, no penetration in other reps, coarse sand, floccs in water column, hard substrate, likely area of sediment transport.
82A	A	No penetration in any of rep from this station, floccs in water column, turbid, likely on debris or hard substrate, wood/organic debris on wiper blade.
82B	A	Gravelly coarse sand, some floccs, moderate sorting, area of sediment transport
82C	A	Brown well sorted fine sand overlying gray fine sand which in turn overlies gray sandy silt, void at left, very nice tube at right SWI, thin veneer of sorted brown sand appears to be transgressive, 6.1 cm layer of fine sand at top appears to overly a relict RPD, very nice pic, area of sediment transport and deposition.
82D	C	Tan and gray fine sand overlying gray silt, voids lower left, deep depositional RPD, top sand layer is 12.6 cm thick, appears to be a 3.0 cm layer of recently deposited silty organic fine sand at the SWI, station is highly depositional, another excellent slide.
83A	A	Soft, tan and gray slightly sandy silt, voids lower right, abundant organic particles in upper sediment column, RPD depositional, tubes at SWI, station is highly depositional.
83B	B	Light gray, very fine sandy silt, bedform, rounded oxidized mudclasts in ripple trough and lee, RPD mirrors surface topography and is thickest in trough areas, very subtle RPD contrast, area of sediment transport, high proportion of fine sand may be masked by silt, nice pic.
83C	A	Similar to Rep B, firm very sandy gray silt, small bedform at left, physically dominated RPD, very subtle RPD contrast, area of sediment transport.
83D	B	3.6 cm layer of poorly to well sorted fine sand overlying gray silt/clay, voids lower left, two large red worms in center 4.6 to 9.6 cm below the SWI, sands are transgressive, clear contact between silt and upper sand layer, area of sediment transport and transient deposition, wood fragment at SWI.
83F	C	No penetration in any of rep from this station, floccs in water column, turbid, likely on debris or hard substrate.
83G	C	Veneer of sorted fine sand overlying poorly sorted gray silty fine sand, minor small wood flakes at SWI, surface washed, RPD physical in origin, area of sediment transport.
84A	A	Very hard tan silt, little surface relief, likely a high fine sand subcomponent although obscured by silt, RPD deeper than penetration.
84B	A	4.4 cm layer of poorly sorted tan silty fine sand overlying gray sandy silt, voids at lower right, dense tubes at center of SWI, top sand layer appears to be a near-recent deposit and is rich in organics, brown material at silt/sand contact at left, FeO-OH at contact in center.
84C	A	Odd mix of rounded gravels and biogenically aggregated silt and detritus, obviously subject to periodic high current velocities, some organic particles in water column and SWI.
84D	C	No penetration in any of rep from this station, floccs in water column, turbid, likely on debris or hard substrate.
85A	B	Soft, gray, slightly sandy silt, voids mid-left, subsurface methane pockets 11.9 cm below the top of frame extending to the bottom of the frame, highly depositional.
85A	E	Soft, tan slightly sandy silt, homogeneous fabric, highly and rapidly depositional.
85B	A	Detritus covered cobble, partial penetration, algae on cobble, high flow, area of sediment transport and hard bottom.
85C	B	Poorly sorted silty fine sand, 0.3 to 1.1 cm veneer of sorted brown fine sand at SWI, void complex lower right with active admixing of surficial sand to depth, surface washed, possible bedform, area of sediment transport.
85D	D	Poorly sorted silty, organic sand, finer at SWI, RPD appears depositional, organic particles interspersed throughout sediment column, unclear whether long-term depositional although appears quiescent at present due to increased oxidized fines at SWI.
86A	C	Very well sorted fine sand overlying tan poorly sorted silty fine sand, RPD>penetration, small organic particles at SWI, area of active sediment transport, sand is hard-packed, nice pic.
86B	C	Rounded gravel in a medium sand matrix, area of active sediment transport, gravels exposed and sand is in interstices.
86C	B	Tangle of silt and organic debris over gravel, tangle of organics is capturing fines, RPD discontinuous and consists of the fines captured by the organic tangle, twigs, leaves, grasses and algae constitute the organic fragments.
86C	C	Silty fine sand with lens of reworked sorted fine sand at right SWI, RPD physical in origin and delimited by the extent of fines, active sediment transport, remarkable picture of advancing bedform.
86D	C	Medium dark sand with fines present only in the RPD, void right center, some washing of the surface, area of sediment transport, sand grains appear rounded.
87A	C	Mix of oxidized medium sand and rounded gravels, RPD physical and > penetration, area of sediment transport, unusual mix of grain sizes.
87B	C	No penetration in any of rep from this station, floccs in water column, turbid, likely on debris or hard substrate, piece of wood debris in right background.

Station/ Rep		Comments
87C	C	Hard tan sandy silt although sand fraction may obscured by silt, RPD appears physical in origin and is greater than penetration, bedform in center.
87D	C	Brown fine sand overlying gray very sandy silt, void in lower right, sorting increases at the SWI and there appears to be recent sediment transport, tubes at right SWI, RPD reworked (physically) at right also, subtle RPD contrast.
87E	C	Moderately sorted silty fine sand, shallow void in right near SWI, evidence of recent resuspension in 0.2 cm band of sorted sand at SWI which also has a thin silt veneer, RPD physical in origin, subsurface sand is nearly homogeneous, area of sediment transport and deposition.
88A	C	Very poorly sorted brown silt and very coarse sand, grain size may be greater than reported but silt masking coarser particles, bedform, rounded coarse sand and small gravel at SWI, RPD greater than penetration but also discontinuous, area of sediment transport.
88B	A	Washed, rounded gravel with interstitial medium sand at bottom of frame, area of active sediment transport, sand present only under gravel armor, leaf in water column.
88C	A	Exceptional well-sorted fine sand overlying poorly sorted silty fine sand, sorted sand layer at surface is 2.5 cm thick and overlies a former RPD, surface sand layer is transgressive and SWI is washed free of fines, RPD > penetration, spectacular photo, area of active sediment transport.
88C	C	Washed gravel with minor medium sand in the interstices under the gravel armor, gravels are rounded, area of active sediment transport.
88E	B	Tan sandy silt over dark gray to black organic silt, voids in lower silt unit, unusual sedimentary fabric, tubes at SWI, RPD depositional, animals mining the subsurface organics, layer of fine brown sand 2.89 cm below the SWI and this represents the bottom of a recently deposited sediment interval, station is depositional.
88E	C	Gray and tan silty fine sand with abundant small organic particles interspersed throughout the sediment column, voids in mid-left and mid-right, large red worms visible in lower center 10.65 to 15.92 cm below the SWI, depositional RPD, station is depositional, nice picture for biological activity.
89A	B	No penetration in all three reps, either on debris or very hard substrate.
89B	C	No penetration in all three reps, either on debris or very hard substrate, organic debris and floccs in water column..
89C	B	Minimal penetration, gravel and cobble substrate washed free of fines, active sediment transport, lag deposit.
89H	A	Mixture of leaf litter and oxidized brown fine sand, appear to have hit wood debris and subsequently disrupted sediment surface, highly organic with freshly deposited sand and leaves, area of sediment transport and accumulation.
89H	D	Very organic brown fine sand overlying brown to tan organic silt, very soil-like in profile, abundant organics interspersed throughout sediment column, overpenetrated, different from Rep A, highly depositional.
90A	A	Gray fine sandy silt with prominent well developed subsurface feeding voids, dark organic particles interspersed in upper portion of the sediment column, biological RPD, sand fraction increases towards the RPD and the station may be dominantly 4-3 phi fine sand that is obscures by gray silt.
90A	B	Gray fine sandy silt with prominent feeding void in center left, tubes at SWI, very abundant small methane pockets riddling the subsurface sediment 4.82 cm below the SWI and extending to the bottom of the frame, sand lag in large feeding voids, station is depositional, biological RPD.
90B	C	Light gray to brown well sorted fine sand, area of sediment transport, large piece of wood debris at SWI.
90C	C	Brown well sorted fine sand overlying brown to tan sandy silt, upper sand layer 6.64 cm thick and contact between two layers is distinct, sands transgressing, area of active sediment transport, RPD > penetration, unusual sediment in that it looks like a soil, mudclast at SWI at left.
90H	C	Gray organic very fine sandy silt, wood and organic particles at SWI, tubes at SWI, small burrow/void at upper right, 3.42 cm band of organically enriched dark gray sandy silt 7.95 cm below the SWI, station is depositional, nice pic.
91A	C	Sorted gray fine sand, RPD thickened at right be sediment transport and transgressing sand, RPD physical in origin, lens of fine organics at depth at right and denotes former sediment water interface prior to bedform migration, station in area of active sediment transport.
91B	A	Brown to gray silty fine sand, moderate organic content of sand, broken tubes at SWI, unusual RPD appears to be two successive RPDs with no discernible breaks, area of both sediment transport and deposition.
91C	B	Gray silty fine sand with broken tubes and small organic debris at SWI, distinct band of sorted fine sand 5.52 cm below the SWI and is 2.13 cm thick, station is depositional with laminar layering.
91G	A	Tan to gray slightly silty fine sand, evidence of resuspension at SWI, area of sediment transport, RPD physical in origin (infiltration and transport), tube at right SWI, bedforms in background
92A	B	Soft gray fine sandy silt with deep depositional RPD, methane filled feeding void lower right, minor small subsurface methane pockets 18.12 cm below the SWI and extending to the bottom of the frame, station is highly depositional.
92B	B	Washed coarse sandy gravel, RPD indeterminate due to minimal penetration and gravels, area of active sediment transport, lag deposit.
92C	B	Soft slightly sandy silt with deep depositional RPD that has subtle contrast with underlying sediment, shallow void upper left, deeper void lower mid-left, small dark organic particles interspersed in upper portions of the sediment column, station is highly depositional.
92D	A	Tan sandy silt over gray silt, small feeding void lower right, numerous small dark organic particles in upper sediment column, RPD depositional and subtle contrast at lower bound, stick amphipod at right SWI, station is depositional and sed similar to Rep C but firmer.
92F	A	Well sorted brown fine sand, bedforms, active sediment transport, RPD>penetration and oxygenation is physical, nice pic.
92G	B	Well sorted brown sand, disturbed at right, lens of black silt 0.39 to 1 cm below the SWI and varies in thickness from 0.1 to 1.03 cm, area of active sediment transport, similar to Rep F.
92H	A	No penetration, either on debris or very hard substrate, all three reps similar.
93A	B	Brown silt, aquatic vegetation at SWI, abundant decaying vegetative matter and roots subsurface, has profile similar to a wetland soil, RPD recently deposited silt overlying hydric soil, unusual pic, depositional.
93B	A	Tan fine sandy silt with tubes at SWI, deep depositional RPD, station is rapidly depositional, organic particles interspersed in upper sediment column.
93C	A	Tan and gray organic silty fine sand, abundant small pieces of vascular and wood debris at SWI, SWI washed, active sediment transport and minimal deposition, RPD highly variable and appears physical in origin.
93D	B	No penetration, likely on woody debris given the high tannin content of the overlying water, small pieces of woody debris in water column, 3 reps similar.
93E	B	Gray fine sand with abundant organic particles at the SWI, RPD physical and consists of brown sand at SWI, active sediment transport, bedforms.
93F	B	Dark brown sorted fine sand over tan sorted fine sand, upper sand layer 1.43 cm thick, area of active sediment transport, bedform, RPD>penetration based on lightness of subsurface sand, RPD physical in origin.
93G	B	Well sorted fine dark sand, sand at SWI has brown oxic coating and defines RPD, RPD physical in origin, active bedform and RPD thickest at ripple crest due to recent movement of bedform, area of active sediment transport.
93H	A	Tan fine sand over gray silt which in turn overlies tan to brown fine sand, SWI is partially washed, RPD physical, top gray silt and brown sand couplet constitutes a depositional interval and is 2.85 cm thick, area of deposition and some sediment transport, unusual picture.
93I	A	Tan poorly sorted fine sand over gray silt, abundant organic matter at SWI, pieces of reeds, shell in background, appears depositional.
93I	C	Gray very silty fine sand, shell at depth, deep depositional RPD, bedform, station is depositional and very different from Rep A..

APPENDIX E

SPI Images Analyzed

(This appendix available only as hard copy at this time)